FLIGHT

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Founder and Editor: STANLEY SPOONER.

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EDITORIAL COMMENT.

THERE is no doubt that all those who are at all intimately connected either with the Air Services or the great industry which supplies those Services, and who think more than superficially, are coming more and more to the opinion that there will, before long, in spite of war conditions, have to be carried out a very drastic reorganisation both of the R.N.A.S. and the R.F.C. Let us hasten to say that it does not follow that in expressing this opinion there is of necessity any criticism implied of the men who have borne the burden and heat of the day, and who have, under all kinds of disabilities, created a really wonderful Service out of practically nothing. They have done well, and that they have not done better must be laid more to the charge of the system under which they have been compelled to work than to any personal failure. The whole fact of the matter, condensed into a few words, is that the Services and their requirements have outgrown the system, and it is the latter that requires change. That may bring in its train changes in personnel as well as in methods, but that is beside the point.

One Air Service, One Uniform, One Badge.

We have heard, during the past few days, of Mr. Orville Wright's sensational statement that, given a sufficiently large air-fleet, the war can be brought to an end in ten days. Now, that may be true or it may be a figure of speech. For our own part, we should venture to predicate that the truth lies somewhere in between, which is simply another way of saying that the war *can* be won in the air, though perhaps it might take rather more than the allotted ten days to accomplish the victory. The main thing that emerges is that if the war can be, and in fact is to be, won in the air, it cannot be so won by spasmodic and divided effort. It will require a concentration of resources and effort which is impossible under the present organisation and duality of control. In a word, the time has come for the creation of a real Air Ministry and an Air Service, separate and distinct from those existing at this present moment. The idea, so far as "FLIGHT" is concerned, is by no means a new one. As a matter of fact, we have long foreseen what was to come, and have consistently advocated this separate Service, under the control of a Board analogous to the Board of Admiralty and the Army Council, with a Minister at its head, responsible to Parliament in the same way as are the First Lord of the Admiralty and the Secretary of State for War. In only one direction have our ideas undergone "expansion." In the past we have advocated such a separate Air Service for the wider strategical uses of war, conceding to the Navy and the Army their own tactical air forces to be employed directly under the commanders-in-chief at sea or in the field. That is to say, there would be created a great Air Service for employment in the larger aims of war, but the R.N.A.S. and the R.F.C. would still continue to exist as departments of the land and sea forces. On reflection, however, we can see vital objections to this. We all know what happened during the first two years of the war, when the two Services—owing to the hereditary antagonism and jealousy existing between them—were bidding against each other for machines, and what the result was of this overlapping of requirements. Production was retarded and prices inflated in a most dangerous manner. We had hoped that the reconstitution of the Air Board and the wider powers conferred upon it would have put an end to all this insane and criminal jealousy, but unless our information is hopelessly at fault it has not even yet succeeded. It is axiomatic that a house divided against itself must fall, and while we do not suggest that there is sufficient friction between the two fighting Services to justify us in applying the description

of divided, there is still enough to form matter for very serious disquiet.

There is only the one real remedy for this state of things, and that is to totally remove the Air Services from the administrative control of the Admiralty and the War Office and to constitute them one separate Service under an entirely independent administration.

We would go the whole hog in this matter of separating the Air Service from the others, and, so that there should be no possibility of confusion or of the one service laying claim to administrative control over the units placed at their disposal by the Air Board, we would advocate a completely distinct and distinctive uniform as the outward and visible sign that the Air Service was neither Navy nor Army, but as distinct from both as these are from each other. If we are going to have a separate Air Service, then let it be in fact separate and visibly so.

We cannot see any valid objection to this course, while there are numberless arguments in its favour. The Navy wants seaplanes and airships. The Army wants aeroplanes, and both want the wherewithal for their working and proper maintenance. Very well. That would, as we have always held in the past, be the business of the Air Service, to provide all the machines, pilots and appliances necessary for the proper carrying out of the aerial functions of war. When working in the field the units of the Air Service would be placed under the absolute orders of the military commander-in-chief and his subordinate commanders, so that no questions of disciplinary powers or command could arise. The same would be the case where the units detailed to work with the Navy were concerned. Administratively and for purposes of supply, however, they would be under the Air Ministry, and wear their distinctive Air Service uniform and Badge.

Doubtless, once again, the point will be urged that the creation of another Service would lead to possible conflict of opinion in the discussion of measures for the prosecution of war. We do not think so. The existing Services are in constant touch and consultation regarding the major issues and the necessary co-operation of the sea and land forces, and it is not apparent that serious conflict of opinion often arises. Naturally, there must be conflict of a minor character where neither side is an expert in the other's business, but these are matters which are quite easily settled with a little common sense and mutual understanding. Nor can we see that there need be any more real conflict of opinion if there were three Services in consultation. Indeed, it would be all to the good, for the reason that each of the three parties to the discussion would be specialists to the extent that each might be expected to know all about his own Service, its capabilities and its limitations.

Apart altogether from the aspects with which we have dealt, there is the vital question of supply and production to be taken into account, and there does not seem to be a shadow of doubt that this could be materially accelerated if the whole were under a single administration. Nominally, that is the system to which we have already arrived, but we do not think it is actually as near that desirable state of things as the mere outsider might imagine. We must not forget that there are still the two Services, each urging its prior claims to consideration, and each giving excellent reasons why it should come first. It would require a very strong man at the head of things, and equally strong men as the heads of departments, to remain uninfluenced by constant appeals of the sort we are able to envisage. Admittedly, we should not altogether get away from that sort of thing even if we had the separate Service we are advocating, but there would be a very marked improvement. The two Services would lay down their requirements, and it would be for the Air Service to see that the necessary co-operation was forthcoming, while—and this is a most important point—there would be a Minister responsible to Parliament and liable to be called to account for any lapses of the department.

We are quite convinced that there is no other way to put matters on a permanently satisfactory basis. Any further "reorganisation" of the present system will merely be perfunctory and temporary. It is manifest to all who have given the matter intelligent study that sooner or later we shall have to create such a separate Air Service, with its own administration, its own distinctive uniform and badge, and, in the name of efficiency, let it be done sooner rather than later.

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Aeroplanes in the Mesopotamia Report.

Nothing seems to have escaped the general atmosphere of deplorable disorganisation which characterised the conduct of the first Mesopotamian campaign, which was the subject of the damning report issued last week. On another page of this issue of "FLIGHT" we publish an extract from the report dealing with this section of the administrative shortcomings in the conduct of the war in the Middle East. Who was responsible for the ill-equipment of the Army in Mesopotamia so far as the supply of aircraft is concerned does not emerge, but there must be some individual in the background upon whom personal responsibility should be fastened. We see that so early as January, 1915, Gen. Barrett was begging for more machines, but, in the words of the report, "it was found impossible to supply any until May, 1915." Then *two* machines were sent, both of a type which experience in France had already shown to be obsolescent! Two months later another pair of equally out-of-date machines arrived, followed in yet another month by six of another type. And so the sordid story goes on of a gallant army starved and rendered ineffective by the crass ineptitude of people who were paid to know better and to do better.

Granting that the main efforts of the R.F.C. were employed in the European theatre, and that there were, in fact, no Army machines that could be spared, was it not possible that the Navy could have come to the rescue and sent out two or three squadrons to fill the hiatus? Were they offered, and if so, what was the answer? If they were not, why not? And if they were and were declined by the Army, what was the reason and who was responsible? These are matters which might very usefully have engaged the attention of the Commission. Yet the report contents itself with the bald statement that "the deficiency of aeroplanes as one of the defects of equipment contributed to the ill-success of the British Army in Mesopotamia during the winter and spring of 1915-1916." Evidence accumulates fast that it is time we had a separate and distinct Air Service. We should then, at least, know whom to hang for such deplorable ineptitude as that which seems to have characterised the supply of the aerial service in Mesopotamia.

Prize Bounty for Naval Airmen.

An excellent principle has been established by the award of prize bounty to the flying officers who so materially assisted in the destruction of the German cruiser "Konigsberg" in the Rufiji River. Technically prize bounty is payable only to the ships' companies of His Majesty's ships of war, and it does not appear that My Lords Commissioners have made the necessary alterations to the regulations governing the award of prize money to bring the Air Service officers and ratings within their scope. In this case, however, the technical difficulty seems to have been got over by carrying the officers concerned on the books of the ships actually engaged

Searchlight reflections on a stormy night. From an original study by J. Prochazka.

in the action. Had this not been the case these officers, who rendered exceptionally valuable services, would not have participated in the bounty. Surely, now that aircraft are an inseparable part of the sea arm, the personnel should be put clearly and properly on the same footing as the officers and men serving afloat. It is simply a question of bringing the regulations—which were perfectly adequate to the needs of a century ago—into line with modern requirements. Now that the Navy has had to be expanded as it has, and to include all sorts of strange arms and methods to bring it up to date as a fighting machine, these obsolete regulations should be revised accordingly.

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A Revival of the Apprentice System.

It has for long been a matter of regret among the deeper thinking of those engaged in the more skilled industries, that the old-time system of apprenticeship has fallen almost into desuetude. The system under which a lad was bound to serve at his trade for a certain number of years before he could qualify as a journeyman ensured that, when the youth had completed his indentures—providing he served them with a firm of repute—he knew his business thoroughly and in every branch. On the other hand, the casual methods which have obtained for the past twenty or more years have had quite an opposite effect, and the skilled industries have become flooded with partially trained workers—men who are good enough as one or two process workmen, but who certainly are far from being the equals as craftsmen of their apprenticed fellows. Why the undoubtedly more effective training system has fallen on evil days does not particularly matter for the purposes of this article. There have been faults on both sides, which have been contributory causes. On the one hand, there is no doubt that in too many cases employers regarded the apprentice as a species of bond-slave, useful in the first instance to assist in financing an often tottering business by means of a heavy premium, and afterwards as a very much underpaid workman. On the other, there has been the spirit of restlessness among the youth of the country to be reckoned with, and a growing revolt against discipline and control. But whatever the underlying reasons have been, there is no question but that the apprentice system gave us a race of craftsmen, while the casual want of system of later years has given us one of only partially trained workers.

The question is, Can the system be effectively revived? That is impossible to say, but the experiment is certainly worth trying in the aircraft industry, which is one of the most highly skilled of the day. And the experiment is to be made on a generous plan, according to an announcement made by the Gnome and Le Rhone Engine Co. The company has been looking into the whole question of boy workers, and has decided that in future no boys will be taken into the works to do work of a productive description unless they are prepared to sign indentures and serve their time as regularly bound apprentices. The scheme as outlined in the company's announcement seems to us excellent. As is pointed out, to require the payment of a premium is to shut the door to many a promising boy who might become a good engineer, and therefore the premium has no part in the scheme. Moreover, the correct view is taken that the wages hitherto generally paid to apprentices have generally been quite insufficient to maintain a boy away from home, or even to materially assist in keeping him while living at home, so a scale of wages has been formulated which is quite 100 per cent. higher than apprentices are generally paid. In addition, boys who are indentured to the company will be allowed to work on piecework when they have become sufficiently proficient, thus enabling them to test their own progress and to gain confidence in their ability.

Further than that, provision is to be made for the continuance of the general education of the apprentice, and he will be required to attend continuation classes in both general and technical subjects during his indentures. That is, we think, an admirable addition to the scheme. It is an unfortunate aspect of our educational system that once the working-class boy has left his elementary school and begun work his education ceases in by far the majority of cases. There is no obligation laid upon him to continue to educate himself, and the lure of the streets and the picture palace is, as a rule, stronger than that of the secondary school. To our way of thinking, this matter of secondary education is one of the most important that will have to be dealt with after the war—if we do not want to be left behind in the race for industrial and commercial supremacy. The widest adoption of the apprenticeship system, on the lines laid down by the Gnome and Le Rhone Co., will be one of the best helps imaginable. Naturally it will not supply the complete solution of the problem, but it will help very materially indeed. On every count, therefore, we think the experiment inaugurated by this company is excellent and deserving of wide-spread adoption by the aircraft industry. We can see no flaws in it, either from the point of view of the firm itself or from that of the parent and the prospective apprentice himself. On the contrary, they both stand to gain very materially. We wish the experiment every success.

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The U.S. and Aircraft Production.

Some time ago a question was asked in the House of Commons—which did not receive any definite reply from the Minister concerned—as to whether we were placing at the disposal of the U.S. the latest designs of aircraft and engines, in order that American factories might get straight on to the manufacture of the latest types of war machines, and thus be saved time and experiment. Although, as we have said, the reply was the reverse of definite, it is being whispered abroad—although we can hardly believe it—that the British Government has actually refused to give our American Allies the facilities denoted in the question. Manifestly, we cannot criticise in imperfect knowledge of the facts, but there is certainly no doubt about the proper policy to be pursued in the matter. Every item and atom of information we possess ought forthwith to be placed at the disposal of the American aircraft manufacturers, so as to let them get straight on with the good work of building an overwhelming number of machines that are fully up to the standard of war requirements as they have become apparent in the light of fighting experience.

So far as we are able to discern, there is only one reason to be advanced against the step we advocate, and that is more an after war consideration than one for the present. It is the entirely commercial one that by following out such a policy we should

be making a present of all our discoveries and improvements, particularly in engines, to a commercial rival. But that is an entirely subsidiary consideration now. The business in hand is to win the war first. Having done that, we can start fairly, on an equal basis of knowledge and experience, and carry on with a policy of commercial competition as keenly as need be, teaching and learning as the trend of discovery alternates from one to the other. For the moment, all those matters are and must be subordinated to the defeat of the enemy. If, then, the position is as it is said to be—though we hesitate to believe that official crassitude can proceed so far—let it be altered at once, and let there be united effort for the attainment of the common end. If necessary, so that the plentiful labour available in America may be utilised to its full, let British controlled factories be forthwith established in the United States, to build both machines and engines, to our standard. By next spring vast numbers of aircraft will be required, and they *must* be, by hook or by crook, forthcoming.

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Lord Montagu and Air Raids on London.

Lord Montagu of Beaulieu is one of the last persons we should accuse of a desire to "encourage the King's enemies," but his speech in the House of Lords the other day, on the subject of air raids on London, must have sent a thrill of satisfaction all through Germany. He told the House that we must expect further raids, and on a much larger scale than we have hitherto suffered from them. We are with him there. We know it is impossible to prevent hostile aircraft reaching the Metropolis occasionally. That much we have said more than once, and have pointed the cure.

When, however, Lord Montagu tells us in so many words that the Germans have a perfect right to bomb London, because it is a "defended city" and the site of a great deal of munitions activity, we confess we are astonished. Did Lord Montagu stop to consider, before he delivered himself of this extraordinary dictum, *why* London is a defended city? Did he not pause to think that when the war broke out London was *not* defended, and would not have been had the Germans observed the ordinary decencies of war and held to the conventions to which the German Government had set its hand? What he argues is that because the Germans began the killing of non-combatant men, women and children, and thus forced us to take measures to prevent it, they are now perfectly justified in carrying out their policy of indiscriminate murder *because* of those preventive measures of defence. It seems to us to be extraordinary doctrine indeed. It is as though to say that because the community has established a police system to prevent highway robbery and murder, the "knights of the road" are fully justified in robbing and murdering if the police do not happen to be on hand to prevent them.

The point he made with reference to London being a great centre for the manufacture of munitions is a little better, but not much. Does he hold that because there are munition factories on the outskirts of London the enemy is justified in bombing, without notice and in broad daylight, the civilian quarters of the City? Moreover, has Lord Montagu forgotten that, according to the usages of civilised war, it is obligatory upon an enemy command to give due notice of intention to bombard even a defended town in order that the civilian population may seek safety? And that notice must be specific and not general. It is no compliance for the enemy to say: "We intend to bombard you some time within the next six months." Even supposing Lord Montagu's arguments were true in substance and in fact, which we deny, it is, we consider, utterly mistaken policy for him to speak as he did, with all the implied authority of a Peer of the Realm, speaking in the Upper House of Parliament. His speech will be quoted from end to end of the German Empire, and capital will be made of it in all the neutral countries as an absolute justification of the Hunnish policy of unbridled frightfulness. That is the greatest pity of it.

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Not Enough Machines.

Speaking at Birmingham the other day on the subject of reprisals for air raids, Mr. Kellaway, Parliamentary Secretary of the Ministry of Munitions, said:

"I believe that if we could systematically and immediately raid German towns every time that a raid was made on British towns and villages, the public opinion of Germany would very speedily compel the German Government to abandon this senseless and brutal form of warfare. If the British Army possessed sufficient aeroplanes for all purposes on the Western Front and for protective purposes at home, and had any to spare for raiding German towns, then I for my part would not hesitate to use aeroplanes for this purpose, and I believe that the conscience of the civilised world would justify us in doing so. But it is quite obviously a case of having available a practically unlimited supply of aircraft, and that unlimited supply we do not, in fact, possess. To provide it we have to increase the available supply of certain classes of skilled labour."

We are perfectly in accord with his opinion that a drastic policy of counter-raids would produce the effect designed. It is because we believe so that we have consistently advocated such a policy. When Mr. Kellaway, however, tells us that we do not possess enough machines to effectively carry it out, we are impelled to ask: Why not? Is Great Britain the only country in the war? Are the manufacturing resources of the Allies so hopelessly inferior to those of the Central Powers that we are hard put to it even to hold our own? Or is it that there has been a want of proper co-ordination of our resources? Obviously, it is the latter. If we needed any stronger arguments than we have given in our article dealing with the need for a separate Air Service, we have it in the statement of Mr. Kellaway. What is wanted is that everything connected with the Air Services should be centralised under a single control. Then we should have at least a chance of seeing the best use made of our enormous capacity for output, and, what is just as much to the point, the best use made of the fruits of that capacity.

We quite agree that the figures of increased output of munitions of war, including aircraft, given by Dr. Addison in the House, are very remarkable, not to say creditable to the Ministry of which he is the head. To have doubled the output of aeroplanes between December and May is something to the good, and shows what can be done when the jealous "scrapping" between two competing Services is reduced to a workable minimum. But even that is not enough, and we venture to think that had the Government grasped the nettle as soon as it became apparent the aerial service must ultimately become a thing apart from the Navy and Army, we might have done even better.

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Previously presumed Killed, now Officially reported Killed.

Lieut. I. Heald, R.N.V.R. (R.N.D.), attd. R.F.C.

Accidentally Killed.

Flight Sub-Lieut. J. N. McAllister, R.N.
Flight Sub-Lieut. J. R. Tulley, R.N.

Drowned.

F 8811 1st Gr. Air-Mech. G. I. Wiseman.

Missing.

Flight Sub-Lieut. B. J. W. Brady, R.N.
Flight Sub-Lieut. A. B. Holcroft, R.N.
Observer Sub-Lieut. L. March, R.N.
Flight Sub-Lieut. R. G. Saunders, R.N.

Previously reported Missing, now reported Prisoner of War.

Flight Sub-Lieut. A. S. Mather, R.N.

Correction: **Accidentally Injured.**

Flight Sub-Lieut. Warwick B. W. Clarke, R.N., *not*, as previously announced, Flight Sub-Lieut. William E. N. Clark, R.N.

Reported by the War Office:—

Killed.

2nd Lieut. G. J. Armitage, R.F.A., attd. R.F.C.
2nd Lieut. L. J. Bailey, R.F.C.
Lieut. P. H. Bigwood, Can. Inf., attd. R.F.C.
2nd Lieut. R. Cameron, Camns. (Sco. Rif.), attd. R.F.C.
2nd Lieut. L. A. Davis, R.F.C.
Lieut. H. M. Jackson, R.F.C.
Lieut. T. F. Lucas, R. Warwicks, attd. R.F.C.
Lieut. M. E. Newton, London and R.F.C.
2nd Lieut. C. M. Sayer, R.F.C.
Capt. E. A. Wickson, Can. Inf., attd. R.F.C.
77646 Sergt. F. Bird, R.F.C.

Died.

Lieut. W. R. Macaskill, Nova Scotia, attd. R.F.C.
42590 1st Air-Mech. C. T. Howell, R.F.C.
49566 2nd Air-Mech. A. E. Taylor, R.F.C.

Previously Missing, now reported Killed.

2nd Lieut. H. A. Croft. R.F.C.
2nd Lieut. H. J. Green, R.F.C.
Lieut. E. J. Y. Grevelink, D. of Well.'s R., attd. R.F.C.
Lieut. H. Hamer, R.F.C.
Major H. D. Harvey-Kelly, D.S.O., R. Ir. R., attd. R.F.C.
Capt. G. B. Hodgson, R.F.C.
2nd Lieut. R. M. Neill, R.F.C.
2nd Lieut. J. I. M. O'Beirne, R. Warwicks, attd. R.F.C.
2nd Lieut. P. C. S. O'Longan, R. Ir. R., attd. R.F.C.
Capt. L. L. Richardson, R.F.C.
2nd Lieut. D. J. Sheenan, R.F.C.
2nd Lieut. G. M. Underwood, R.F.C.
2nd Lieut. D. C. Wollen, R.F.C.

Previously Missing, believed Killed, now reported Killed.

2nd Lieut. I. L. Pinson, S. Staffs., attd. R.F.C.

Previously Wounded and Prisoner of War, now reported Died of Wounds as a Prisoner of War in Germany.

Lieut. H. D. K. George, R. Dub. F., attd. R.F.C.

Previously Missing, now reported by German Government Killed or Died of Wounds.

14454 Corpl. R. D. Fleming, R.F.C.

Previously Missing, now reported Died.

Capt. J. D. Stuart, Can. Pion., attd. R.F.C.

Died of Wounds.

2nd Lieut. F. W. Maclean, R.F.C.

Previously Wounded, now reported Died of Wounds.

2nd Lieut. D. W. Stacey, R.F.C.

Accidentally Killed.

2nd Lieut. T. W. Bartle, Aus. F.C.
2nd Lieut. N. V. Clarke, R.F.C.
2nd Lieut. R. V. Franklin, R.F.C.
Lieut. R. H. Herd, Aus. F.C.
2nd Lieut. H. S. Kitson, Aus. F.C.
11024 2nd Air-Mech. G. N. Hill, R.F.C.

Wounded.

2nd Lieut. L. Ansell, London and R.F.C.
Lieut. W. Birkett, Can. Ont., attd. R.F.C.
Lieut. G. C. Body, R.F.C.
Capt. N. A. Bolton, R.F.C.
Lieut. N. Boucher, R.W. Kent and R.F.C.
2nd Lieut. J. A. Craig, R.F.C.
2nd Lieut. J. R. Currington, Lincolns, attd. R.F.C.
2nd Lieut. W. E. Dawson, R.F.A. and R.F.C.
2nd Lieut. P. J. Gardiner, R.F.C.
2nd Lieut. A. E. Gill, R.F.C.
Lieut. H. B. Hammond, M.C., R.F.A., attd. R.F.C.
2nd Lieut. W. F. E. De B. MacLaren, King's (L'pool), attd. R.F.C.
Lieut. H. K. Sykes, R.F.C.
2nd Lieut. H. Stroud, R.F.C.
2nd Lieut. G. F. Webb, R.F.C.

Previously reported Prisoners of War, now reported Wounded and Prisoners of War.

Lieut. A. Binnie, R. Scots Fus., attd. R.F.C.
Lieut. N. A. Birks, R.F.C.
2nd Lieut. G. N. Brockhurst, R.F.C.
2nd Lieut. J. F. Heagerty, Buffs, attd. R.F.C.
Lieut. E. L. Heyworth, R.F.C.
2nd Lieut. A. R. M. Rickards, R.F.C.

Missing.

2nd Lieut. G. C. Atkins, R.F.C.
Lieut. H. C. Barlow, Lancs. Fus., attd. R.F.C.
2nd Lieut. B. H. Bean, R. Welsh F. and R.F.C.
2nd Lieut. R. S. Bennie, R.F.C.
2nd Lieut. T. St. G. Caulfield, R. Inniskg. F., attd. R.F.C.
Lieut. W. T. Coles, Ox. and Bucks L.I., attd. R.F.C.
Capt. J. Davidson, Cam. Hrs., attd. R.F.C.
Lieut. R. W. Ellis, R.F.C.
2nd Lieut. G. T. Harker, R.F.C.
Lieut. D. R. C. Lloyd, R.F.C.
2nd Lieut. R. S. Lloyd, R.F.C.
2nd Lieut. D. C. H. MacBrayne, R.F.C.
2nd Lieut. T. M. McFerran, R.F.C.
2nd Lieut. E. T. Philip, R.F.A., attd. R.F.C.
2nd Lieut. H. G. Spearpoint, R.F.C.

Previously Missing, now reported Prisoner of War.

2nd Lieut. M. M. Kaizer, R.F.C.

Previously Missing, now reported Prisoners of War in German hands.

2nd Lieut. E. L. Edwards, Welsh, attd. R.F.C.
2nd Lieut. J. G. H. Frew, R.F.C.
2nd Lieut. C. D. Grierson, Yeo. and R.F.C.
2nd Lieut. H. D. Hamilton, R.F.C.
Lieut. G. P. Harding, M.C., Cheshire, attd. R.F.C.
Lieut. E. L. Heyworth, R.F.C.
Lieut. S. S. Hume, Yeo. and R.F.C.
2nd Lieut. H. Kirby, R.F.C.
2nd Lieut. E. R. Law, R.F.C.
2nd Lieut. E. A. Lloyd, Yeo. and R.F.C.
Lieut. O. D. Maxted, Buffs (E. Kent) and R.F.C.
2nd Lieut. C. W. McKissock, R.F.C.
2nd Lieut. E. S. Moore, R.F.C.
Lieut. B. Smith, Essex and R.F.C.
2nd Lieut. F. Stedman, I.A. Res. of Off., attd. R.F.C.
2nd Lieut. A. M. Sutherland, N'land. F. and R.F.C.
2nd Lieut. F. H. Wilson, R.F.C.
2nd Lieut. W. O. B. Winkler, R.G.A. and R.F.C.
2nd Lieut. F. H. Wooliams, R.F.C.

Corrections: **Wounded.**

Lieut. H. G. P. Okeden, R.F.C., *should read* Lieut. H. D. Parry-Okeden, Australian F.C.

Wounded and Missing.

2nd Lieut. H. Y. C. Clarke, R.F.C., *should read* 2nd Lieut. H. Y. Chatfeild Clarke, S. Wales Bord., attd. R.F.C.

Prisoner of War in German hands.

2nd Lieut. H. Davis, E. Yorks, attd. R.F.C., *should read* 2nd Lieut. H. D. Davies, R.F.C.

Rewards for Zepp. Strafers.

THE King has been pleased to confer the Military Cross on the following officers, in recognition of their conspicuous gallantry in attacking and destroying an enemy airship:—

Capt. R. H. M. S. SAUNDBY, R. Warwick. Regt. and R.F.C.
2nd Lieut. L. P. WATKINS, Can. Inf. and R.F.C.

The Lights of London.

ON Sunday last restricted lighting in London commenced at 10 p.m., and blinds should be drawn at that hour until the end of the month. In August the hour will be 9.30 p.m., and in September 8.30 p.m. from the 1st to 16th, inclusive.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Club House.

The following prices have been fixed for the present by the Committee :—

Bedroom (including Bath)	.. 5s. each per night.
Breakfast	.. 2s. 6d.
House Luncheon ..	.. 2s. 6d.
House Dinner	.. 3s. 6d.

Billiard Room.

The Billiard Room is now open for the use of the Members.

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W. 1.

Subscriptions.

	£	s.	d.
Total subscriptions received to June 27th, 1917	11,832	15	1
Staff and Workers of Gwynnes, Ltd. (Forty-first contribution)	9	13	8
Total, July 3rd, 1917	11,842	8	9

B. STEVENSON, Assistant Secretary.
3, Clifford Street, New Bond Street, W. 1.

Prize Bounty for Naval Aviators.

AN important decision was given in the Prize Court on July 2nd, when the President, Sir Samuel Evans, in pronouncing judgment, said the officers and men in the aeroplanes which assisted in the destruction of the German cruiser "Konigsberg" were entitled to share in the award. The description of the operations, taken from Admiral King-Hall's despatch, was given in "FLIGHT" of December 10th, 1915. It may be recalled that one aeroplane was piloted by Flight-Comdr. John T. Cull and the other by Flight-Comdr. H. E. M. Watkins.

Commander Maxwell H. Anderson, R.N., who supported the claim, said the pilots and observers of the aeroplanes belonged to the R.N.A.S., and were lent to the "Severn" and the "Mersey" for these operations. They were on the books of the monitors, and he submitted that they formed part of the crews of those vessels and were entitled to share in the prize bounty.

Mr. Harold Hardy, for Mr. Mordaunt Snagge, on behalf of the Procurator-General, supported the motion, and said that he agreed that for the purpose of bounty the pilots and observers of the aeroplanes were to be included in the crews of the monitors.

The President, in giving judgment, said: This is an application on behalf of the officers and ships' companies of H.M.S. "Severn" (Capt. Eric J. A. Fullerton, D.S.O.) and "Mersey" (Commander R. A. Wilson, D.S.O.) for prize bounty for the destruction of the German armed cruiser "Konigsberg" in the River Rufiji in the circumstances described in the affidavit of Capt. Fullerton and the report of Vice-Admiral Sir H. King-Hall. The only new feature in this case is that application is made also on behalf of the officers and men who were serving in the aeroplanes to be included among those who are entitled to have prize bounty granted and distributed. The officers and men of the two aeroplanes belonged to the R.N.A.S., and it is admitted that they were attached to the "Mersey" and the "Severn" for these operations; and it is clear from the report that the services rendered by them were of a very valuable kind. I think that I am acting well within my powers in deciding that the officers and men belonging to the two aeroplanes, for the purpose of section 42 of the Naval Prize Act, 1864, formed part of the crews of the "Severn" and the "Mersey," to which vessels they were attached.

I pronounce and declare, therefore, that the officers and ships' companies of the "Severn" and "Mersey" and the officers and men of the two aeroplanes were present at and assisted in the destruction of the armed ship "Konigsberg," belonging at the time to enemies of His Majesty, and that at the beginning of the engagement there were on board the "Konigsberg" 384 persons, and therefore the amount of the prize bounty payable at the rate of £5 per head is £1,920.

Advances in Aeroplane Workers' Wages.

IT was stated on June 28th that the Arbitrator's award regarding aircraft workers' wages has now been circulated to unions. It concedes 5s. per week advance, dating from April 1st, boys and youths 2s. 6d. Any general advance since January 1st is to be merged in this award.

Fatal Accidents.

AT the inquest on Lieut. Jacob at Birmingham on June 25th, near Birmingham, a statement by Lieut. Villiers, who was injured and is in hospital, was read. He said that after climbing to 3,500 ft. they looped once, and were preparing to loop again when he found the controls were jammed. The machine side-slipped and fell 2,800 ft. He tried to break the fall by pulling into two trees, but failed.

A verdict of "Accidental Death" was returned at an inquest at Plymouth on June 25th on Flight Sub-Lieut. H. L. Cowe, R.N.A.S., who was fatally injured through a seaplane nose diving from a height of 1,000 ft.

A verdict of "Accidental Death" was returned at an inquest at Hounslow on June 26th on Capt. H. B. Hamber, R.F.C., who died from injuries received through his aeroplane nose-diving into a field at Harlington.

Air-Mech. Stanesau, who accompanied him in the machine, was killed outright.

It was shown in evidence that the captain went with the mechanic to the assistance of another pilot who had come down. After seeing him safely off, he reascended. The machine was observed to turn sharply, fall for some distance, resume a level course, and finally crash to the earth from a height of between 300 and 400 ft.

Major Chadwick, R.F.C., stated that the Accidents Committee had held an official enquiry, but could advance no theory as to the cause of the affair.

2nd Lieut. J. H. E. Barron, of the Royal Flying Corps, was flying a biplane at Hendon on June 25th when he fell about 50 ft. The machine was smashed and the officer killed. Lieut. Barron was 42.

The accident is attributed to the officer trying to turn the machine as he was rising.

An aeroplane fell from a considerable height in a field near Bristol on June 25th. Capt. G. W. T. Lindsay, R.A., and 1st Air-Mech. C. E. Sharman were killed instantly.

The Fate of Lieutenant Dorme.

SUB-LIEUT. DORME, one of the most popular of French airmen, who left on a reconnoitring flight on May 25th and did not return, is now officially regarded as missing. He had brought down 23 enemy machines by May 18th, and had been decorated with the Legion of Honour, the Military Medal and the War Cross.

Noted German Pilot Killed.

A GERMAN newspaper states that the parents of Lieut. Allmenröder, one of the officers attached to Capt. Baron von Richthofen's air squadron, have received information that their son has been killed in an air fight. He was last mentioned on June 6th, when he was credited with having brought down his twenty-fifth and twenty-sixth enemy machines.

Letters and Parcels for the R.N.A.S.

IT is officially notified that letters and parcels for officers and men of the R.N.A.S. who are serving abroad should be addressed as follows: Name of addressee (stating rank or rating), unit in which serving (*e.g.*, No. 4 Wing or No. 11 Kite Balloon Section), care of G.P.O. The words "B.E.F." should not be used.

AIRCRAFT IN THE MESOPOTAMIA REPORT.

THERE are several important references to aircraft in the Mesopotamia Commission Report. In their note on the condition of the Indian Army on the outbreak of war, it is pointed out that "an aircraft establishment had been started a few months before July, 1914, but its scope was very limited."

Among the instructions given to General Nixon on his appointment to the command in Mesopotamia was one to report on aircraft. In the section of the Commission's Report dealing with armaments and equipment, it is stated :—

"Among the defects of equipment one of the most important was the want of aeroplanes. But for this the Indian military authorities were not responsible. When the war broke out they were just beginning to organise an aviation service, and had established a flying school. But at the request of the War Office they closed the school, and sent the officers who were pilots back to England. These were only three in number, as matters were in a very embryonic stage. But early in the Mesopotamia Expedition the need for aeroplanes was apparent. In January, 1915, General Barrett represented the importance of this matter more than once, and Lord Hardinge strongly urged the need for aeroplanes upon the War Office. But it was found impossible to supply any until May, 1915. Then two Maurice Farmans were sent, in July two Caudrons, and in August six Martinsyde Scouts. Somewhat later, three hydroplanes of the Short type were sent, and two naval aeroplanes, one a Voisin and one a Henry Farman, fitted with a Canton Unné engine. In October, four B.E.2 C's arrived. But there were many misfortunes. The hydroplanes were not a success, and among the aeroplanes there were losses through engine failure, through other accidents and through normal wear and tear. These misfortunes seem to have worked with aggravated effect by reason of the difficulties of repair, which in part depended on the difficulty of transport. The upshot was that at the date of the Battle of Ctesiphon there were only reckoned to be five aeroplanes belonging to the Royal Flying Corps in Mesopotamia, and of these only three seem to have been actually available at the battle—a Maurice Farman, a B.E. 2 C. and a Martinsyde. This reckoning does not appear to include the naval aeroplanes, of which, however, only one was of any use. None of these machines were fitted either for photography or with wireless apparatus; and though valuable work was done, they were of course inadequate for what was required. The personnel of the Royal Flying Corps was organised as a flight, and there were six flying officers and 44 rank and file. During December, 1915, and January, 1916, owing to two machines being shut up in Kut, to accidents, and to the ill-health of pilots, sometimes only one aeroplane was available. Another flight of aeroplanes was sent out in February, 1916, and from then onward, the Royal Flying Corps maintained a supply of new machines. After that date there does not appear to have been a shortage in numbers of machines, and from the same time apparatus both for photography and wireless telegraphy came into use. But early in February, 1916, the Turkish troops, who till then had been without aeroplanes, were furnished with three fast aeroplanes of the Fokker type, which were much more formidable fighting machines than anything possessed by the British Army. The presence of these fast machines with the Turkish Army placed the British airmen at a great disadvantage; and the want of at least one efficient fast fighting machine was keenly felt.

"It is clear that the lack of a sufficient supply of aeroplanes of any kind in the operations which led to the Battle of Ctesiphon seriously hindered our troops in the task they had to perform, and that the want of fast fighting aeroplanes later prevented the Royal Flying Corps being of as much service to the Expedition as they might have been. How far these defects were remediable by the War Office opens up the wide question of the general supply of aeroplanes for the purposes of the War, which has been the subject of an independent enquiry. We are not in a position to express any opinion upon that question, and we certainly should not deny that the first claim upon the resources of the Royal Flying Corps was in Europe and not in Mesopotamia. It is not, however, clear why a larger number of aeroplanes of a type not sufficiently fast for service in France should not have been available for the advance on Bagdad, nor why those which were sent were not equipped for photography and wireless telegraphy. The difficulty of sparing fast machines in the spring of 1916 to fight the three Turkish Fokkers is more intelligible. But we note the deficiency of aeroplanes as one of the defects of equipment which contributed to the ill-success of the British Army in Mesopotamia during the winter and spring of 1915-16."

THE FATE OF ONE OF THE HUN AIR-RAIDERS.—A German plane in the North Sea, which has been brought down, being gradually consumed by fire.

THE ROYAL FLYING CORPS AID COMMITTEE.

LADY HENDERSON, in opening the meeting of the Royal Flying Corps Aid Committee on July 2nd, dealt with the Committee's work during the past year, and emphasised the importance of the coffers of the fund being full before the cold weather sets in. Since the start Lady Henderson said they had collected over £27,000, and the number of men to provide for had now reached well over 20,000. They still continued the small individual parcels, sending to each man in Mesopotamia, Africa, Salonika, Egypt and India every six weeks. The men in France, it was reckoned, got one every two months. With these they went the round of all the wings, starting with headquarters.

In addition to the small parcels, they had sent out in bulk the following articles, for which requisitions had been received:—Rubber boots, 1,891 pairs; oilskins, 1,243; canvas shoes, 357 pairs; hedger gloves, 69 pairs; sou'-westers, 300; mufflers, 3,954; cardigans, 1,818; socks, 10,129 pairs; mittens, 3,028 pairs; helmets, 1,162; footballs, 216; vests, 500; shirts, 888; pants, 344 pairs; cigarettes, 1,002,620; gramophones, 25 (12 records to each); and 78,856 parcels.

Lady Henderson said that in November last, with the assistance of Mr. W. M. Letts, of the Crossley Motor Co., she was able to meet the chairmen of many firms who are interested in the manufacture of aeroplanes. Mr. White Smith, Chairman of the Society of British Aircraft Constructors, Ltd., and four other gentlemen had volunteered to form a small committee to draw up an appeal for a fund which was to be divided equally between the R.F.C. and the R.N.A.S. unless the sum sent was especially ear-marked for either service. As a result of this appeal just over £4,000 was received, for which most grateful thanks are due to them. It has enabled the fund to carry on its work during the last six months, which could not have been done without this help. The fund was now closing for the summer months, except of course the prisoners' department, but if funds were forthcoming they hoped to open again in September. It should be realised that it is during the winter that the bulk of the things are needed, especially in the outlying stations, where the small parcels are a real necessity (besides being a small excitement), as it is impossible, owing to continuous work, for the men to get to the canteens, which are some distance off.

Lady Henderson mentioned a few names of those who have given many generous gifts and also their valuable advice and help, without which it would have been very difficult to carry on the work, including Messrs. Coates, of Paisley, and their employees; Messrs. Euing, of Liverpool; Cadbury Bros., Messrs. Morton; Mr. Jameson, of Messrs. Booth and Jameson; Mr. Milledge, of Lewisham; and the messenger girls at the Air Ministry (known as the "Brown Girls") have knitted a large quantity of socks in their spare moments between running messages; and others, too numerous to mention, have sent gifts and helped in many ways.

In September, 1915, the work was extended to our prisoners of war, officers, non-commissioned officers and air-mechanics.

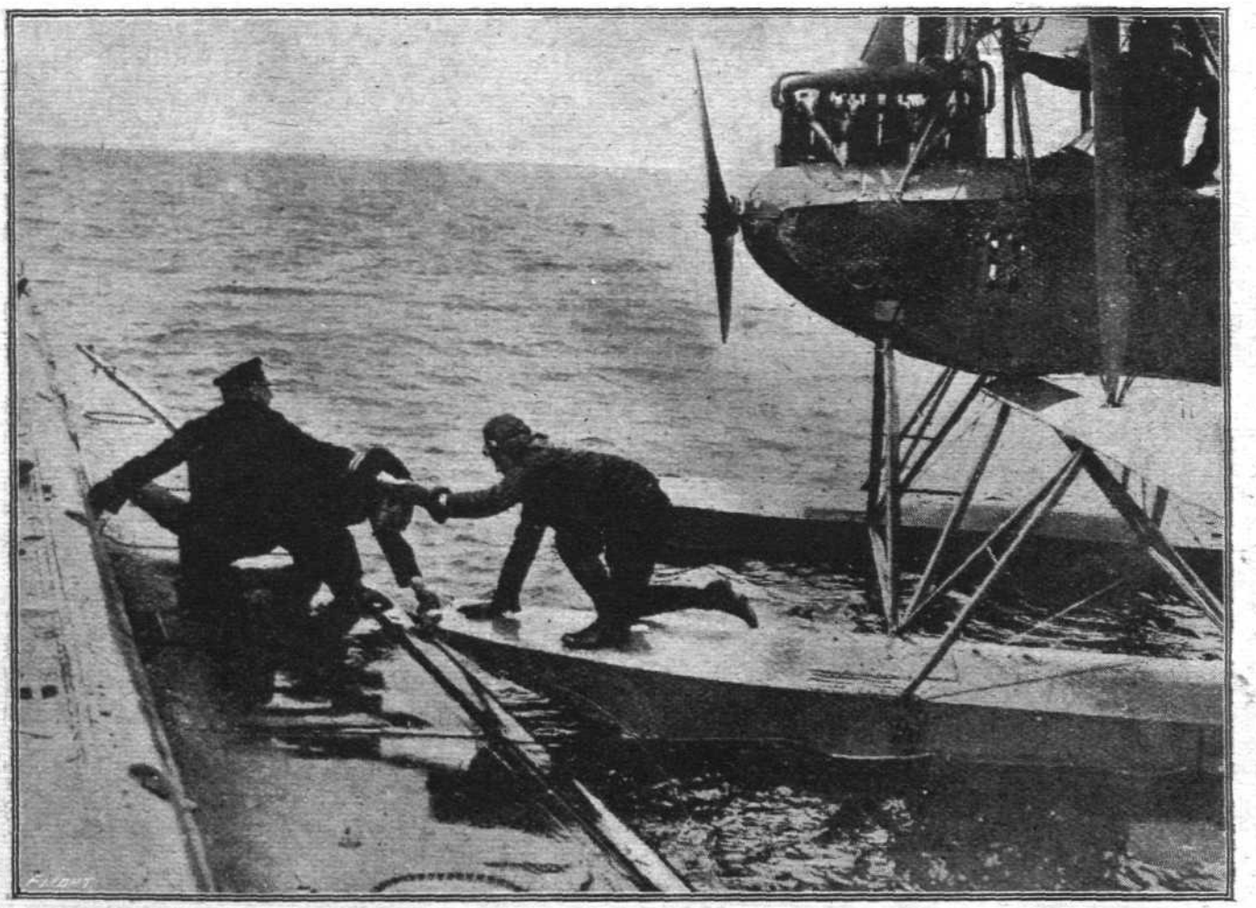
When the new regulations came into force the Committee became the Registered Care Committee for all R.F.C. prisoners, which necessitated having an entirely separate branch. In the work for the R.F.C. prisoners there are two objects—one is to send the prisoner as many of the things he wants as possible, the other is to assist his relations and friends in any way we can.

A parcel of food is sent off directly a new prisoner's address reaches the office, and if the next of kin are abroad the parcels are continued every week until other instructions are received. Parcels sent direct from home arrive safely if they are strongly packed, but since many parcels fall to pieces even before they reach Surrey House, it is easy to understand why prisoners often complain that they do not get their home parcels.

Lady Henderson pointed out that the R.F.C. Aid Committee at present are the only aid committee that packs for officers, and they make a point of trying to send them things they particularly ask for, instead of dealing out uniform standard parcels.

If any relatives are only able to send their son a small parcel, the Committee add to it, and that is one reason why they need subscriptions to their fund.

If the prisoner is a non-commissioned officer or an air-mechanic the procedure is much the same, except that



The co-operation of German Air-Raiders with Hun U-Boats.—A German pilot going aboard a U-boat from his seaplane.

directly the Committee hear which camp he is at they arrange to send him three food parcels a fortnight and a supply of bread. This is provided out of the funds, and is another reason why donations are needed.

There are 40 non-commissioned officers and air-mechanics known to the Committee to be in Germany at present, which is a small number compared to the officers, but this is because very few of the former fly.

As well as the regular parcels the men receive extra ones from their relations, and the Committee forward parcels sent for them from home; all parcels for non-commissioned officers or air-mechanics must pass through the Committee's office. Lady Henderson said she was told that this rule will be made to apply to officers in August, also that the amount that may be sent to officers weekly will probably be restricted; at present there is no rule about this, though a private may not receive more than 30 lb. of food each week. When parcels are arriving regularly this should be an ample supply. Several officers have written lately asking the Committee to send less. She was afraid most prisoners suffered from hunger for the first few weeks, before any parcels reach them, unless they were sent to a large camp where they could share with the others. The Committee had on their books 387 officers, prisoners in Germany, and the majority of these are receiving parcels from us.

Last week 645 parcels left Surrey House. Nearly all were food parcels, though a few contained clothes for the men.

Clothes are supplied to the Committee to issue to the men. They have to wear a special uniform of black piped with yellow, which she supposed was to make it more difficult for them to escape. So far no R.F.C. man has succeeded in getting away, though a corporal was recaptured 2 miles from the frontier after travelling 18 days in Germany. Altogether 5 R.F.C. officers have escaped and reached England. Seriously wounded officers have been sent to Switzerland, one of whom, Lieut. Goode, recovered so completely that he got married.

Except for three or four officers who died of their wounds soon after being captured, none of them had died in Germany, which shows that they were well looked after in hospital.

As to the prisoners in Turkey, there were 24 officers and seven men; 21 men were taken at the fall of Kut, but very few of these had survived. Several officers are at Afion Kara Hissar, and were heard from occasionally. They seemed to get parcels fairly regularly when they were allowed to send them. At present they were prevented doing so by the Austrians, who would not allow prisoners' parcels to pass through their country.

The officers at Afion Kara Hissar ask particularly for tea and saccharine; they were able to buy a certain amount of food, but they say the price of tea in Constantinople is 18s. for ½ lb.

There are four officers in Bulgaria to whom parcels are being sent, but no acknowledgments from them had yet been received.

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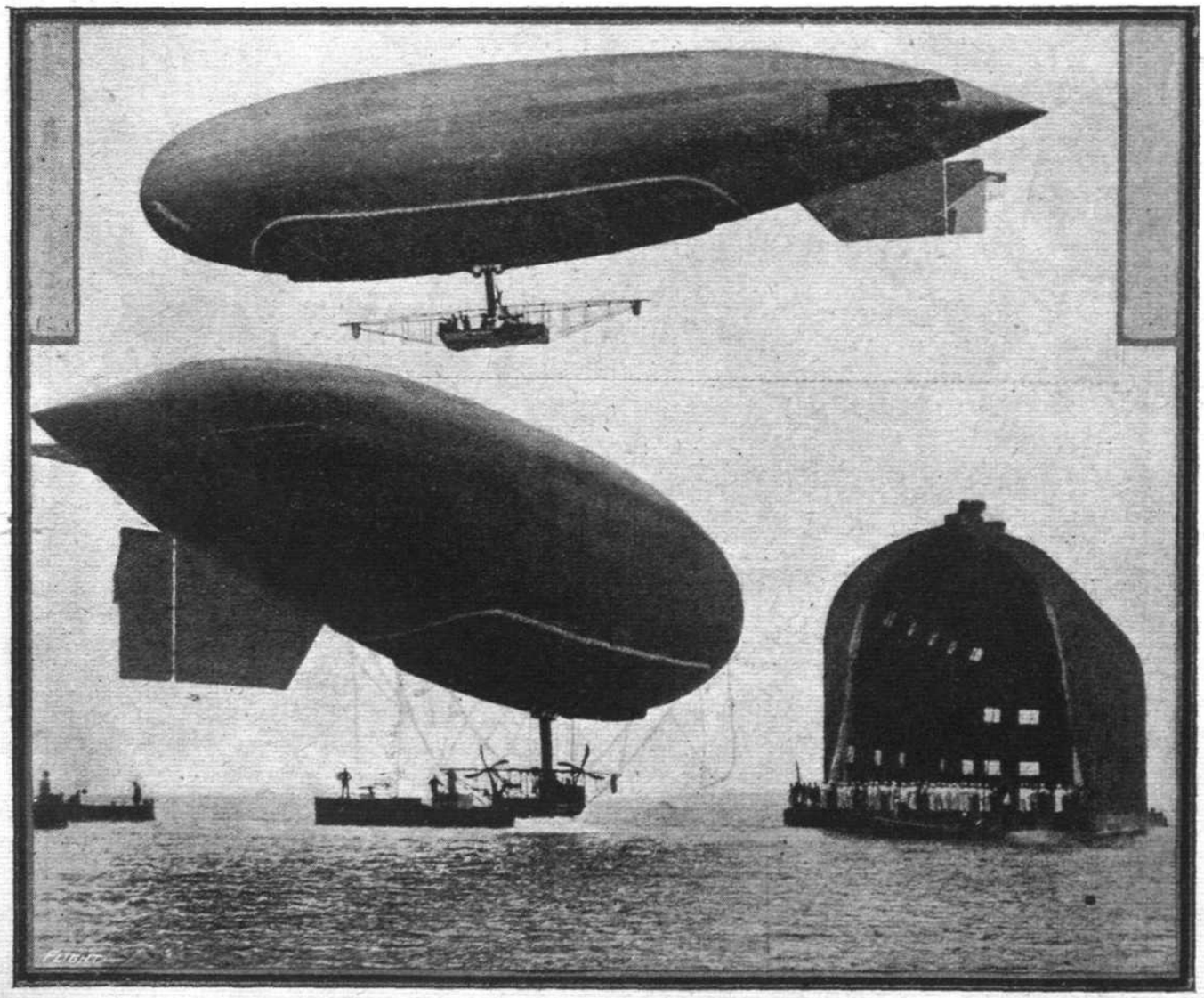
Air Raid Warnings.

THE Lord Mayor has received the following letter from the Home Secretary:—

Home Office, June 29th, 1917.

Dear Lord Mayor,—With reference to the interview which we had on the subject of public warnings of air raids in London, and the subsequent conference with yourself and some of the mayors, I think it right to inform you that the whole question has been brought before the Cabinet, and, after very careful consideration of the advantages and disadvantages of the proposal, the Cabinet decided that it is not desirable in the public interest, in present circumstances, that public warnings of air raids should be given in London. As you were good enough to inform me that you were willing to leave the matter to the decision of the Government, and to abide by their decision, I thought you would like to learn from me the conclusion at which they have arrived.—Yours truly, GEORGE CAVE.



Two views of the "D.N. 1," the American Navy's first non-rigid airship, built by the Connecticut Aircraft Co., and which successfully passed its test flights recently at Pensacola.

AIRISMS FROM THE FOUR WINDS

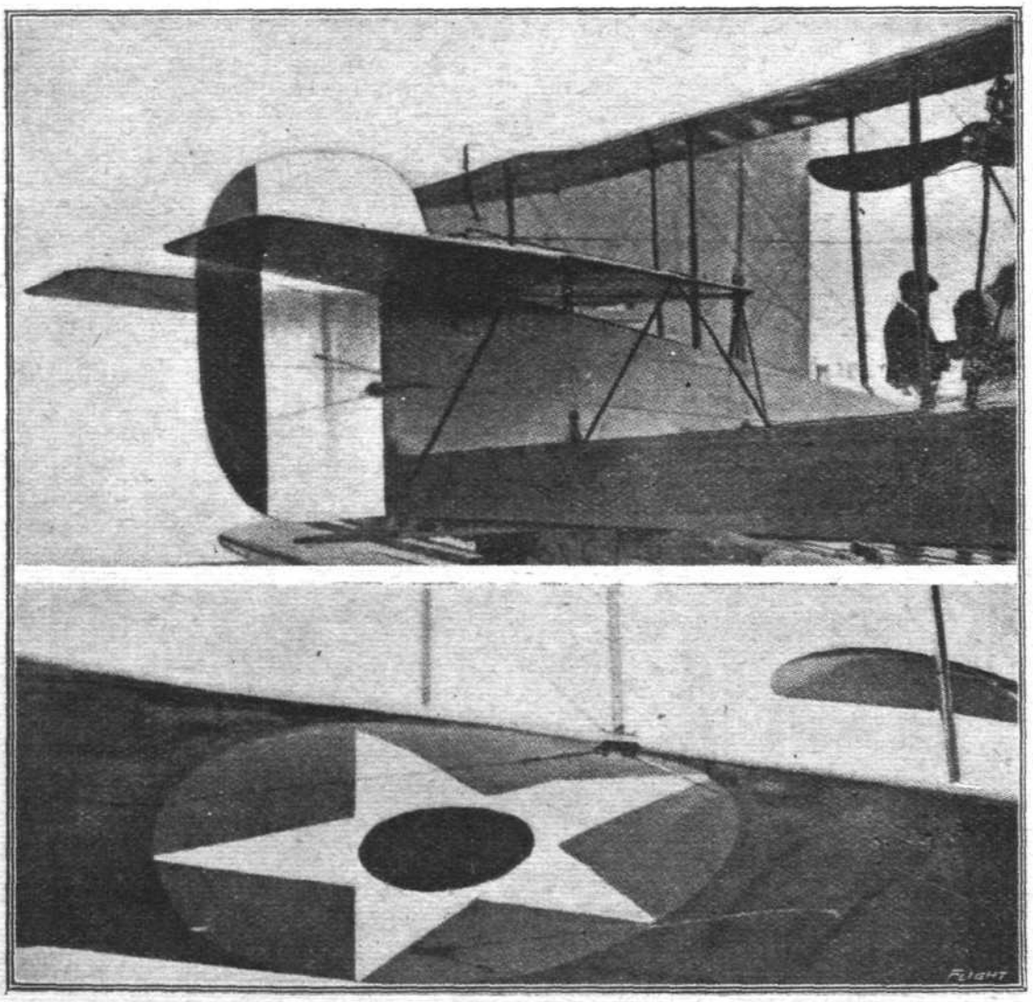
DESPATCHES from Zurich some time ago made much fuss of the fact that Germany and Austria are covering their aeroplane wings with paper instead of fabric, the latter being none too plentiful in the Central Empires. If the despatches were sent out with the idea of giving another proof of the Germanic race's cleverness, like their usual custom, they are once again but copyists, as paper covering of aeroplane wings is an old idea in this country. Ask Mr. A. V. Roe. If we are not mistaken he had several memorable experiences with his earlier machines in the way of paper-covered wings. For slow, lightly loaded machines, paper is not a bad material at all as a makeshift, but one does not quite fancy it for the modern scout loaded at the rate of some 7 or 8 lbs. to the square foot. Once a small tear is started—as, for instance, by a machine gun bullet—paper has a nasty habit of ripping, but perhaps the idea is that when a 'bus has "gone west," as not infrequently happens when our boys can get at them, the enemy can shrug his shoulders and comfort his public by saying that it was "only a scrap of paper."

OUR regular air patrols over London during the daytime are occasionally, when noticed, raising a curious feeling of uncertainty in the minds, not to say bodies, of the citizens. Is it a Hun or one of our own is the question that must necessarily arise. There is one comfort about it, that the patrolling machines being sufficiently high up are not, owing to the hum of London traffic, often heard, and still less therefore seen or noticed, else might we expect a regular punctuation of confusing siren shrieks and bell clanging according to the particular taste of each local municipality. It's a mercy anyway that London is pronounced free from the infliction.

THAT picturesquely painted description, by one of the participants, which has gone the rounds of the German papers, of the aeroplane attack on London, in which the writer callously refers to the bomb "greetings from the German to the English people," which he helped to distribute, has at least found little favour with *Vorwaerts*, which journal, upon many occasions, to its credit, has during the war recorded its opinion, in the face of the Censor, against some of the Hunnish methods of conducting war. *Vorwaerts'* comment upon this latest very questionable effusion is to the effect :—

"It is necessary to remark that the writer of this article discharged a military order but no political mission from the German to the English people. A military action in which, unfortunately, non-combatants and women and children also lost their lives, cannot suitably be described as greetings from the German to the English people."

THAT the deeds of the R.F.C. and R.N.A.S. during this war will live in history there is not over much doubt. The one difficulty will be to truly record them, with a due sense of proportion, having regard to the dates when accomplished and the surrounding circumstances of each individual deed of heriosm. That an effort in this direction is being made, however, we have very much pleasure in announcing. It is proposed to gather together a war record of the R.F.C., and it is to Capt. G. L. Campbell, Devonshire Arms Hotel, Bandon, Co. Cork, to whom all information bearing upon the subject should be sent. Out of over 700 flying officers killed in action, died of wounds or accidentally killed, the compilers of the biographies have already track of about 600. Officers' relatives therefore should see that they communicate with



The identification marks for aircraft adopted by our new ally, America. The centre is red, the star white, and the background blue. The colours on the rudder are red, white and blue, as on our own machines.

Edward F. Hinckle, of the Lafayette Escadrille, standing in front of the first aeroplane to carry the American flag over the French lines.—(*"Aerial Age Weekly."*)

Capt. Campbell without delay, in case their lost one happens to be amongst the minority, of which no particulars have so far been included.

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"FOR saying that the King had no more right to rule than the Kaiser and that the Germans would win, Joseph T. Kennelly, an Irishman, was fined £10 at Newcastle yesterday."—*Daily Paper.*

WHY not hand this patriot over to the winning side *via* the trenches in France. There would be one Hun the less to eat *our* rations in England.

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ACCORDING to the *Yorkshire Post* "it has been found necessary to cancel the combing-out order relating to uniformed clerks employed by the Air Board at the Hotel Cecil. It was originally intended that all men above the medical categories of Biii and Ciii should this week be transferred to other centres, with a view to being sent abroad for service with the R.F.C., their places in London being taken by women and men of the lowest classifications. On the eve of their departure, however, it was found impossible to secure immediately substitutes of the required efficiency. The plans of the Department are on a mammoth scale, and it is represented that the removal of the men concerned, even when their duties consist only of typing, would seriously affect the carrying out of the expansion that has been decided upon."

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WHICH is all good hearing, and points to our getting on with the war "in the air" in real earnest. For further particulars, see our leader on "One Air Service, One Air Uniform, One Air Badge." There are many other directions in which the combing out process can preferably be brought into immediate play without loss of efficiency.

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LORD MONTAGU'S recently described plan for dividing up the air into strata zones for the heavy air 'bus, the light air van, the private aviator, the Government machines, and away on top the fast-climbing and speedy scouts and other greyhounds of the air, gives us the answer to that one-time absurdity, "The higher the fewer." This hitherto unanswerable argument must now be added to the other things which the conquest of the air has solved.

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"ONE of the most consistently successful of our airmen at the Front was formerly a famous polo hand. His chief regret in connection with his present work is that it will spoil him for polo. After a long course of flying under war conditions, polo, he thinks, will hardly yield a thrill again."—From *A Londoner's Diary.*

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MAY Air-Mechanic A. W. Stock's fate be a warning to other thoughtless workers. It seems hardly credible, but the fact remains that he persisted in smoking when engaged in a hut making powder puffs, with the result that a spark from his cigarette ignited a fuse and caused an explosion, he and two other men being seriously injured. For his folly he has paid the penalty of death in hospital, and even youthfulness cannot be blamed—he was 40 years of age. When will munition workers realise the immensity of their responsibility to their co-factory-workers?

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"A LITTLE while ago I was going to a big Scout demonstration. The fact was advertised, and it got to the ears of Kaiser Bill, who sent a fellow over in an aeroplane and he dropped a bomb on my train. The train could not go for some time."

Thus lightly did Lieut.-Gen. Sir Robert Baden-Powell, when addressing South-West London Scouts at a rally held at Hurlingham Club last Saturday, treat his narrow escape from death.

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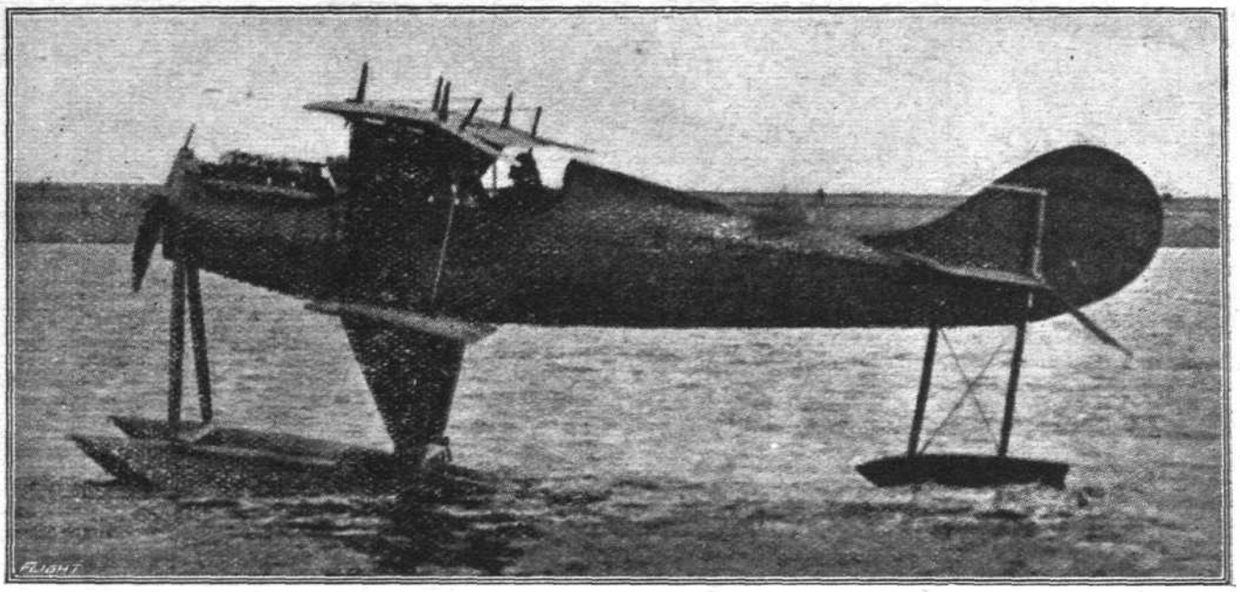
WHEN the Amateur Budgeter for the Chancellor of the Exchequer takes things in hand, you may reckon for sure upon having some light literature worth reading—it all depends upon the point of view you look upon these things. A nice little example of the discovery of a mare's nest of this type is that recorded in the *Times* last week in connection with aircraft insurance. In the course of a communication upon this subject, a correspondent of our contemporary suggests that, "as there is something like one and three-quarter billions sterling held covered against fire by the

A Morane Monoplane flown by one of the members of the Lafayette Escadrille.—(*"Aerial Age Weekly."*)



By courtesy of "Flying."

Side view of the small Burgess "single-strutter" tractor seaplane, a front view of which appeared in "FLIGHT" for May 31st last.

different insurance companies in the United Kingdom, the Government should pass an Act demanding the insurance companies to add 1*d.* per cent. on the renewal premiums, and this 1*d.* per cent. would be handed over to the Government, as this tax would produce something like £73,000,000 sterling (a nice nest-egg and source of revenue). There would be no need of new officials, as the insurance companies' accounts are audited, and the auditor would pass the amount on to the Government. By the above England, Ireland, Scotland and Wales would then help those who are compelled to live in the danger zone."

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CAUTION not unnaturally suggests that so delightfully smooth a method as the above for raising a round 70 millions or so of revenue must have a "nigger" concealed somewhere about its body, or even so innocent a person as a modern Chancellor of the Exchequer would have in the past couple of years stumbled across such a tempting source somehow or another. And so it is hardly surprising that the *Times* very effectually demolishes by an array of facts the dreams of this would-be financier. "We do not," explains the *Times*," recognise the figure on which the correspondent bases his calculation, but it is clear that an addition of 1*d.* to all the rates of premium per cent. secured in the United Kingdom by fire insurance companies would produce only a comparatively small sum. The total premium incomes of all the British fire offices is about £30,000,000, of which, probably, quite two-thirds is derived from business outside the United Kingdom, leaving about £10,000,000 as the amount obtained from home business. If the average rate of these premiums be assumed to be 3*s.* per cent., a charge of 1*d.* per cent. on this income would amount to about £280,000, which would hardly be an extraordinarily handsome sum out of which to meet all possible claims in the British Isles caused by aircraft attacks and bombardment."

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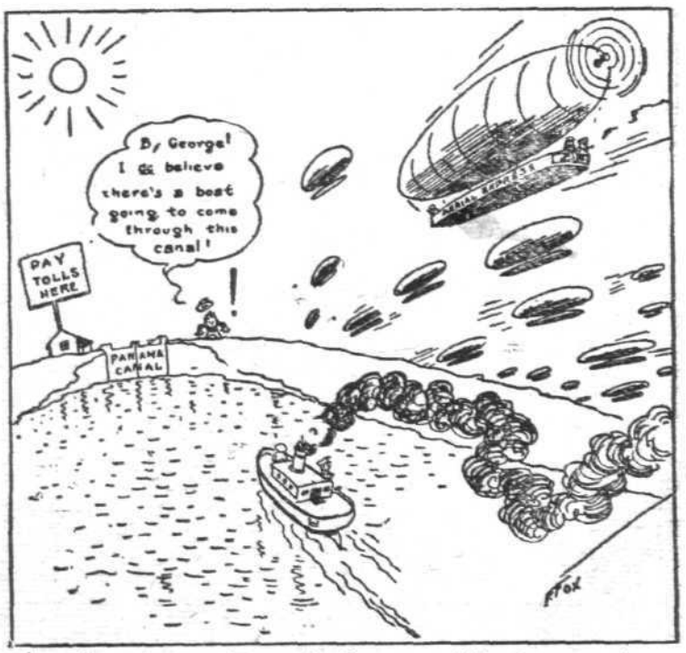
WE fancy the Chancellor got on the right tack in his air insurance scheme after all, although it is true he was an awful long time thinking about it, after the whole idea had been promulgated in the pages of "FLIGHT" a couple of months after war started.

▣ ▣

Air Fighting in June.

THOUGH there were several days on which the fighting was very bitter—those, for instance, which preceded the infantry attack on the Messines Ridge—the battles for supremacy in the air during the month of June were not, as a whole, on so large a scale or so great in intensity as those which were fought in April and May, says the *Times* in its excellent summary for the month. In those two months, respectively, 717 and 713 aeroplanes were put out of action, either permanently or temporarily. Last month the total, as recorded in the British, French, Belgian and German daily *communiqués*, was only 392, of which 110 belonged to the Allies and 282 to the Germans. The superiorty of the British airmen was as marked last month as in the preceding months.

During this period British Headquarters in France reported that 78 of our aeroplanes had failed to return to their bases. But against this loss we were able to claim as a set-off 230 German machines, of which 131 were destroyed by our airmen and gunners (the latter brought down 11) and 99 were driven down out of control. Seven of the enemy machines fell in our lines. Including three which were brought down in May but not reported during that month, the French accounted for 48 German aeroplanes, 41 being destroyed and seven driven down in a more or less damaged condition. Belgian airmen destroyed four enemy machines. The greater number of Allied machines claimed by the Germans fell in fights, but it is impossible to give the exact figure, owing to the frequent use in the official reports of the phrase "air fighting and anti-aircraft guns." Two items of interest on the personal side of the German flying service were, first, the reappearance in the official *communiqués* of Cavalry Capt. Baron von Richthofen on June 25th, after an absence from them of nearly two months; and, secondly, the death of Lieut. Allmenröder, who was a member of the Richthofen squadron or "circus."



An American view of Commercial Aeronautics: "Why worry over canal slides when things will soon be like this?"—*(New York Evening Sun.)*

ANSWERS TO CORRESPONDENTS

[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—ED.]

Notice to Correspondents in General.

Applications for commissions in the Royal Naval Air Service should be addressed to the Director of Air Services, Admiralty, S.W. The necessary form and conditions of entry can be obtained from the Secretary of the Admiralty.

Applications for commissions in the Royal Flying Corps should be sent to the Director-General of Military Aeronautics, Hotel Cecil, Strand, W.C.

Those who wish to enlist in the R.N.A.S. should apply to the nearest naval recruiting station or to the R.N.A.S. Drafting Office, Crystal Palace, S.E. Skilled mechanics are taken whatever their army classification, but unskilled men are only taken if they are classified B1, B2, or C1.

Recruiting for the R.F.C. is closed for the time being, and any enquiries should be made to the Officer Commanding, Royal Flying Corps Depôt, Farnborough.

Enquiries with regard to appointments in the A.I.D. should be addressed to the Chief Inspector, Aeronautical Inspection Department, Hotel Cecil, W.C. 2.

C. H. J. (Sutton Coldfield).—We should say that the machine represented in your sketch is an R.E., although the sketch is not clear enough to enable us to determine the series number. Yes, the other machine is a Nieuport scout. During the war it is not permitted to publish scale drawings and descriptions of modern machines, and we cannot, therefore, at present supply you with the scale drawings you require.

R. C. P. (Leyton).—The centre of head resistance of an aeroplane is determined by taking the resistance of the various items, such as wings, body, struts, chassis, &c., and considering the moment of each item, the centre of thrust being generally taken as the centre of moments. In an ideal machine the thrust, the resistance, and the lift should all pass through the centre of gravity. In a good many machines the centre of thrust is slightly below the centre of resistance, the couple thus set up being counteracted by another couple formed by having the centre of gravity slightly ahead of the centre of lift. With this disposition the machine will, when the engine is switched off, have a tendency to dive, thus getting on to its proper gliding path. If the centre of resistance were below the centre of thrust, the machine would have a tendency to drop its tail on switching off, which is, of course, undesirable. As a general rule the thrust-resistance and weight-lift couples are to be kept as small as possible, since otherwise the machine may have a tendency to pitch.

H. J. W. (Goodmayes).—You do not state whether you refer to variable camber or variable incidence. We take it, however, that you have in mind the former. There are several difficulties to overcome in producing a variable camber, valuable as that feature would be on a modern aeroplane where a wide speed range is a necessity. In the first place, the operating gear required to turn a wing section having the characteristics desirable for high speed into one giving very great lift for slow landing, would necessarily be complicated and fairly heavy, so that the extra lift obtainable with the deep camber would be almost, if not quite, used up in lifting the weight of the operating gear. Several methods have been tried, some with internal lever arrangements which were intended to arch the section between the spars, while in others the rear spar was dropped, thus increasing both the camber and the angle of incidence. We have no information regarding the practicability of either of these types. Another and simpler way of altering the camber is to hinge the entire trailing portion of the wing after the fashion of an *aileron*, but although this is a much simpler proposition mechanically, a section having at some point a sudden break in its curves cannot be so efficient as one in which the change of curvature is gradual. A difficulty inherent to any type of variable camber is that of so attaching the fabric covering that it will adhere closely to the curvature of the ribs at any point.

Sound Waves.

We have received from Mr. S. T. G. Andrews, B.Sc., the following communication :—

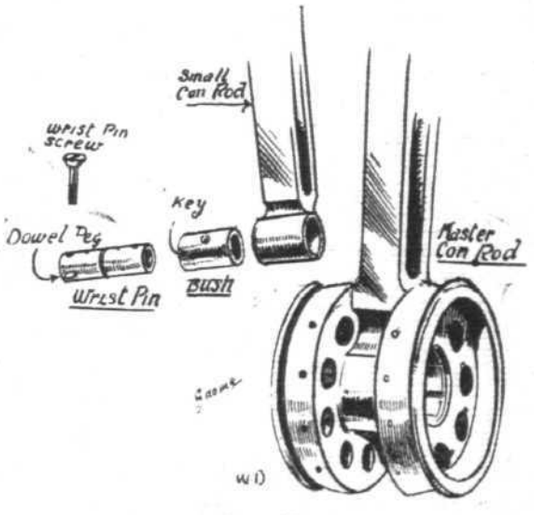
"I see that a correspondent, G. B. P., in this week's paper, gives what he calls an explanation of the sounds heard as an aeroplane approaches and recedes from an observer, and contradicts a statement previously made—but which I do not recollect—that the sound rises as the aeroplane approaches.

"Surely this is merely a simple application of Doppler's principle. As the aeroplane approaches, it follows up the waves which it has first sent out in the direction of the observer, and consequently a greater number of waves are crowded together in a given length of air, and as a result a greater number are received per second than the number sent out, and the pitch rises. When the aeroplane is receding it draws away from the waves, and consequently a smaller number are received than the number sent out and the pitch falls.

"An easy way of verifying this is to put a whistle in the end of a rubber tube some 6 ft. long. Then if the tube is whirled in a horizontal circle around the head while blowing into the open end an observer standing a short distance away will hear most distinct rises and falls in the pitch as the source, that is the whistle, approaches and recedes.

"It is also capable of fairly easy mathematical proof, taking into consideration the velocity of the wind in addition."

W. D. (Maidstone).—The method of attaching the connecting rods of a rotary engine to the crank shaft differs somewhat. In the accompanying sketch is shown a fairly typical arrangement, *i.e.*, that of the 100 h.p. monosoupape



Gnome. There is a so-called master connecting rod, which has a big end of the shape shown, to which all the other connecting rods are attached by means of the wrist pins shown. The wrist pins have a small peg near one end, which prevents the pin from turning. The details will, we think, be clear from the sketch.

G. M. (Kenley).—There have been cases of transfer such as you refer to, but they are very rare. If you are eligible you would be more likely to obtain a commission in the R.F.C.

Y. Z. (Hampstead).—You will find all the information you desire in the Aviation Pocket Book, which can be had from "FLIGHT" offices for 5s. post free.

Wireless (Hendon).—A simple explanation of the various instruments used in wireless telegraphy is given in "The Elementary Principles of Wireless Telegraphy." It is published in two little volumes which can be ordered from "FLIGHT" offices for 4s. post free.

Casualties.

Second Lieutenant ROBERT EDWARD (ROY) ADENEY, the Queen's (Royal West Surrey Regiment), attached to R.F.C., reported "missing" on April 11th, and now reported by the Comité International de la Croix-Rouge, Geneva, to have died at Douai from wounds received in an aerial action on that date, was the only son of Mr. and Mrs. W. H. Adeney, of Dulwich, and was aged 19. He was educated at the City of London School and Hurstpierpoint College. In March, 1915, at the age of 17, he joined the Inns of Court O.T.C., and received his commission the following June. Last August he was attached to the Royal Flying Corps, and got his "wings" in December. His squadron commander writes:—"Lieutenant Adeney's patrol was seen to successfully engage a hostile patrol, two of which they destroyed, and about an hour later they were heavily engaged with a far superior number of hostile machines (10 to three)."

Second Lieutenant JOHN SPENCER DUNVILLE, Dragoons, who died on June 26th from wounds received in action on the previous day, was the second son of Flight-Commander John Dunville, R.N., and Mrs. G. Dunville, of Redburn, Holywood, co. Dublin, and of Sion, co. Meath, and was aged 21. He was educated at Eton, and at the age of 18 was gazetted to the 5th Reserve Regiment of Cavalry in September, 1914. Subsequently he obtained a commission in a Dragoon regiment, which he joined on active service in June, 1915.

Lieutenant REGINALD WILLIAM FOLLIT, R.F.C., aged 26, reported missing on April 28th, is now stated by his observer (a prisoner) to have died after an aerial engagement in France. He was the younger son of Mr. William Follit, of Avenue House, Clapham Park, S.W., was educated at St. Lawrence College, Ramsgate, and early joined the H.A.C. After the outbreak of war he was granted a commission in the R.F.A., and when in France was transferred to the R.F.C., acting as an observer. He obtained his pilot's certificate in England, and returned to the front on April 18th.

Lieutenant H. D. K. GEORGE, Royal Dublin Fusiliers and R.F.C. (died of wounds as a prisoner, was the only son of Mr. and Mrs. Duncan George, of Stanhope Terrace, Hyde Park, and was born at Satara on July 23rd, 1897. He was educated at Clifton (Barff's House), and passed direct into Sandhurst in September, 1914. After completing the Sandhurst course he received a commission in the Royal Dublin Fusiliers, and, following a period of service with a battalion in Cork, he joined his regiment in France. In July, 1916, he returned to England for a course of training for the Royal Flying Corps. In March, 1917, he went to the front, and during a reconnaissance far behind the German lines his patrol, under the command of Captain Leefe Robinson, V.C., attacked and was heavily engaged with a large number of hostile aircraft. Lieutenant George's machine, piloted by Lieutenant Leckler, was forced to land at Lewardi, south-east of Douai, where he was made a prisoner and removed to St. Clothilde's Hospital at Douai, wounded in the leg and back. In the German list, dated May 23rd, Lieutenant George is reported to have died on April 6th.

Major HUBERT DUNSTERVILLE HARVEY-KELLY, D.S.O., Royal Irish Regiment, attached R.F.C., killed in action, was the son of the late Colonel H. H. Harvey-Kelly, of the Indian Army, and was born in 1891. He joined the Irish Regiment in 1910, got his captaincy five years later, and the rank of Major very shortly afterwards. Major Harvey-Kelly has been a squadron commander in the R.F.C. since the beginning of last year. For his services during the present war he has been mentioned in despatches, and in 1915 was awarded the D.S.O.

Lieutenant HERBERT M. JACKSON, R.F.C., who was killed in action on July 18th, was a son of Mr. M. Jackson, Greenisland Lodge, Greenisland.

Captain RICHARD HENRY DRIFFIELD LEE, Norfolk Regiment and R.F.C., killed on special flying duty on June 23rd, was the elder son of the Rev. Frederick and Mrs. Lee, of Woodton Rectory, near Bungay. He was educated at St. John's Foundation School, Leatherhead, and later became one of the staff of the Norwich Union Fire Office. He received his commission in the Norfolk Regiment in 1912 and his (temporary) captaincy in 1915, and the same year he was seconded for service with the Royal Flying Corps and attached to a squadron at the front. Being wounded a few weeks afterwards he returned to England, and subsequently became a test pilot for new machines. Early in the present year he was gazetted captain, and a few weeks ago received a special appointment with a rank of flight-commander. Captain Lee's only brother, also of the Norfolk Regiment, died in March of last year from pneumonia contracted while on duty.

Second Lieutenant CHARLES MACKINTOSH, R.F.C., whose death at the age of 38 on active service in France was recently announced, was educated at the City of London School, and had been living in Germany for some years before the war. A year before the outbreak of war he crossed into Switzerland, becoming winter sports representative of the Royal Automobile Club, and a *Daily Mail* correspondent, whose thorough knowledge of the French and German languages was especially valuable. Together with several other journalists, he was falsely accused of spying, and for ten weeks was imprisoned in Berne before the trial by court-martial, when he was acquitted. Second Lieutenant Mackintosh was very well known in Switzerland in all winter sports centres. The official paper of the *Automobile Club de Suisse*, in a notice on his death, quotes him as "a great friend of our country, who had done much for the development of sport in Switzerland." Towards the end of last year Second Lieutenant Mackintosh joined the Roal Flying Corps, and was an observer in the 18th Squadron. The manner of his death was all that an airman could desire: quick, sudden, and in the middle of a fight with an enemy machine. Shot in three places, he must have died instantly, while the pilot, although mortally wounded, brought the machine down safely, dying himself immediately after landing. His widow and three children are living at Gryon-sur-Bex in Switzerland.

Second Lieutenant STANLEY W. MANN, R.F.C., killed in France during a fight in the air with four German machines, was educated at St. Olave's Grammar School, London, which he left as a senior Oxford scholar. He commenced his flying career at the Hall Flying School, Hendon, received his commission in the R.F.C. March 6th, 1916, and flew to France in June of the same year. He was reported by his Flight Commander as one of their finest and most brilliant pilots. He was 21 years of age, and the only son of Mr. and Mrs. Walter Mann, of Erncroft, Twickenham.

Second Lieutenant FRANCIS ST. VINCENT MORRIS, Sherwood Foresters and R.F.C., who, at the age of 21, died of wounds received in action on April 10th, was the youngest of the four sons of Canon and Mrs. Morris, of Ashbourne, Derbyshire. Educated at Bowden House, Harrow, Seaford, and Brighton College, on leaving school he entered Wadham College, Oxford, but at once applied for and obtained a commission. Subsequently he was attached to the R.F.C., of which he became a most capable officer. In the execution of a daring flight his machine was brought down in a snowstorm, and from the serious injuries he received he died on April 29th. His three brothers are serving with their regiments in France.

Second Lieutenant ROLF MAYNE NEILL, R.F.C., whose death is officially announced, was killed in an air action on June 3rd, aged 19. He was the only son of Mr. Harold Neill, London correspondent of *La Prensa*, Buenos Aires, and Mrs. Neill, of 22, Eldon Road, Kensington, W. 8. He was educated at the Priory, Malvern, and Westminster School, where he was in the O.T.C., from which he went straight into the R.F.C. He was a keen footballer, and obtained his pinks. In three months he gained his wings, and joined a squadron at the front. He was killed on the anniversary of the day on which he was commissioned.

Lieutenant D. J. SHEEHAN, R.F.C., who was previously reported missing on May 10th, is now reported from an unofficial but apparently reliable source to be dead. He was the son of Captain D. D. Sheehan, M.P., Royal Munster Fusiliers.

Second Lieutenant DOUGLAS W. STACEY, R.F.C., of Bulawayo, who died of wounds on June 20th, at the New Zealand

Stationary Hospital, was the youngest son of the late John E. Stacey, of Dorset, and Mrs. Stacey, of 4, Glendower Place, S.W. He was born at Sherborne in 1885, and was educated at Merchant Taylors' School, London. For the last 10 years he had been gold-mining in Rhodesia, four of them in tributing the "Godwin" mine. He came to England last year to volunteer for the Royal Flying Corps, and proceeded to France on May 30th of this year.

Lieutenant CYRIL ASHLEY COOPER, East Yorkshire Regiment, attached R.F.C., was killed on the 29th ult., together with a mechanic, whilst flying from a Scottish aerodrome. Second Lieutenant Cooper was the son of Mr. and Mrs. Ashley Cooper, of Lyndhurst, Elm Park Road, Winchmore Hill, N., and was commissioned to the East Yorks Regiment in May, 1915, whilst in France. He returned to this country, and later, in 1916, transferred to the R.F.C., obtaining his wings in February last. At the time of the accident he was acting as instructor in gunnery.

Captain GEORGE WALTER THOMAS LINDSAY, Royal Field Artillery, attached R.F.C. (died on June 25th as the result of a flying accident), was eldest son of Lieutenant-Colonel H. E. M. Lindsay, C.B., R.E., and of Mrs. Lindsay, of Ystrad Mynach, Glamorgan, and Glasnevin House, County Dublin. He was born on January 29th, 1891, and was educated at Wellington and the Royal Military Academy, Woolwich. He passed out of Woolwich into Royal Artillery in 1911. Going to France with the First Division of the Expeditionary Force in August, 1914, he was wounded in November of that year. Subsequently he commanded a battery in France and at Salonika, and he joined the Royal Flying Corps in November, 1916. Captain Lindsay, both at school and in the Service, was an unusually good all-round athlete.

Flight-Lieutenant LEWIS MORGAN, R.N., whose death in a flying accident was announced on May 11th, was the second and only surviving son of Captain L. H. G. Morgan and Mrs. Morgan, of Cheddoncote, near Taunton. He was educated in H.M.S. *Conway*, and obtained his commission in the Royal Naval Reserve in 1908. On the outbreak of war he served for nine months on the North Atlantic Station. Subsequently he was transferred to the Royal Naval Air Service, and secured his pilot's certificate in June, 1915. He was a skilful and cool pilot; made a good many strenuous flights, especially when he was on active service in German East Africa. Lieutenant Morgan's two brothers, Captain and Adjutant F. Morgan, R.F.A., and Second Lieutenant W. B. Morgan, South Lancs. Regiment, both lost their lives in Gallipoli.

Missing and Prisoners of War.

News has been received by the headmaster of the Jews' Hospital and Orphan Asylum that his son, Second Lieutenant M. KAIZER, R.F.C., is a prisoner of war in Germany, and is wounded in the left arm.

Flight Sub-Lieutenant L. P. PAINE, D.S.C., R.N., who is reported missing, is believed to be a prisoner of war. He has seen considerable service in Egypt, and had been connected with experimental aviation with his brother, Mr. Hubert Scott-Paine, the general manager of the Supermarine Works, as far back as 1910.

The Rev. Herbert Stead, Warden of the Browning Settlement, Walworth Road, S.E., has received information that his son, Lieutenant G. C. STEAD, of the R.F.C., is a prisoner of war, unwounded.

Married and to be Married.

On June 22nd, at U.F. Church, Burnt Island, Fifeshire, Flight-Lieutenant BERNARD C. H. CROSS, R.N., son of Mr. and Mrs. H. E. Cross, of Elborough Street, Southfields, London, was married to JESSIE L. BARKER, of Southfields.

A wedding will shortly take place between EVA MAY, younger daughter of Commander Sir TREVOR DAWSON, Royal Navy, and Lady DAWSON, of 2, Green Street, Park Lane, and Captain RALPH MICKLEM, Royal Engineers, son of Mr. Leonard Micklem, of Abbots Mead, Elstree.

Captain C. DRURY FULLER, Royal Sussex Regiment and R.F.C., was married on July 2nd, in Holy Trinity Church, Sloane Street, to BEATRICE, daughter of Sir ROBERT FULTON, LL.D., and Lady Fulton, 7, Sloane Gardens, S.W. Captain Norie Fuller, R.F.C., acted as best man, and a guard of honour was formed outside the church by lads of the Paddington Brigade.

Captain GILBERT WARE MURLIS GREEN, D.S.O., M.C., etc., son of Mr. J. W. Murlis Green, of Beckenham, at St. Mary's, Wandsworth, on June 17th, when home on special duty from Salonika, married to EVA, daughter of Mr. A. GODWIN, of Wandsworth Common. Captain Murlis Green has since gone again to Salonika. It is hoped to celebrate the wedding at a more convenient and peaceful date.

An engagement is announced between Lieutenant J. JENSEN, R.F.C., only son of Mr. J. Jensen, of Westerham, Kent, and GWYNIFRID BARRINGTON, eldest daughter of Mr. and Mrs. T. H. B. Palmer, of 1, Sutton Court, Chiswick, late of The Ivy House, Bushey.

An engagement is announced between Major ERNEST LITHGOW, Royal Army Medical Corps and R.F.C., eldest son of Dr. T. G. Lithgow, of Farnborough, and grandson of the late Colonel the Hon. Ernest Curzon, Oxfordshire Light Infantry, son of the first Earl Howe, and DORIS, elder daughter of Colonel A. M. BALFOUR, D.S.O., Royal Field Artillery, and Mrs. Balfour, of The Close, Tetbury, Gloucestershire.

The marriage arranged between Miss MAVIS MULLER and Major G. S. M. ASHBY, R.A. and R.F.C., took place on June 16th at Holy Trinity Church, Cookham.

At St. Bartholomew's Church, Southsea, on June 28th, Second Lieutenant GRAHAM STRANG STEEL, R.F.C., only son of the late Thomas Steel, was married to MARION CHALMERS, only daughter of the Rev. James HENDERSON, 26, Victoria Grove, Southsea.

Items.

Brigadier-General L. E. O. CHARLTON, R.F.C., opened the hostel provided by the Eccentric Club for disabled soldiers last Wednesday, as a memorial to the late Captain Ball, V.C. It is in Mare Street, Hackney, and among those attending the ceremony were Alderman Ball, father of the gallant aviator, the Mayor of Nottingham, the Recorder of Nottingham, Sir A. Griffith-Boscawen (of the Pensions Ministry), Sir Charles and Lady Wyndham, Sir Frederick Milner, and many other distinguished people who were acquainted with Captain Ball. The members of the Eccentric Club have subscribed over £10,000 for the Captain Ball Hostel, and three similar places designed for the benefit of discharged disabled soldiers who are attending courses of instruction at the various polytechnics and technical institutions in London.

As a result of Miss HELEN MORRIS's matinée at Wyndham's Theatre on June 19th, a cheque for £400 has been handed to Lady Henderson to provide comforts for the Royal Flying Corps in the Near East.

Captain SAUNDBY, who has just been awarded the M.C. for destroying a Zeppelin, is 21 years old, and is the second son of Dr. Robert Saundby, of Birmingham, who is a Lieut.-Colonel of the R.A.M.C. Before the war Captain Saundby held a commission in the Warwickshire Territorial Force, and he went on service immediately on mobilisation. Though weighing 13 stone, and being 6 ft. 3 in. in height, he obtained a commission in the R.F.C., and went to France as a pilot about 12 months ago. He brought down a Fokker, but was wounded in the encounter. It is presumed that the distinction now conferred upon him is in connection with the destruction of Z48 in East Anglia on June 17th. This is in a measure corroborated from a letter to relatives in which he wrote:—"I had never been up at night before, but it was a fine experience. The Zepp burnt beautifully. We shall never forget the sight."

The will has been proved at £8,894 of Captain and Flight-Commander JOHN WILLIAM WASHINGTON NASON, Royal Sussex Regiment and R.F.C., of Grosvenor Crescent, St. Leonards-on-Sea, who played cricket for Cambridge University in 1909 and 1910, and for Sussex and Gloucester Counties, and Association football for the University, and was killed on June 9th, aged 27, son of the late Dr. Nason, of Corse Grange, Gloucester. The will, made on active service, reads: "Anything or any money I have is to be divided between you, Baby and Charlie." Probate is granted to Lieutenant William Frederick Charles Nason, R.F.C., the brother.

The will of the late Mr. HORACE LEONARD SHORT, of Eastchurch, Kent, of the firm of Short Bros., has been proved at £69,565 gross, with net personalty £59,770.

British Medal for Orville Wright.

THE annual report of the Royal Society of Arts announces that the Council have awarded the Society's Albert Medal to Mr. Orville Wright "in recognition of the value of the contributions of Wilbur and Orville Wright to the solution of the problem of mechanical flight."

FLIGHT

The British Air Services

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

Admiralty, June 26th.

H. F. Bond entered as Prob. Flight Officer (Temp.). seniority Mar. 11th.

The following have been entered as Prob. Flight Officers (Temp.), seniority June 17th: H. Brown, F. G. B. Callow, L. de V. Chisman, J. H. Curtis, C. G. Edwards, P. Ferguson, W. F. Ferrier, C. L. Fraser, W. Gilman, L. Jolly, A. R. Kelly, R. I. Kirkland, T. S. Oliver, L. B. Ransford, F. Y. Smith, N. B. Thomas, G. O. Smith, K. H. G. Tilley, C. R. C. Wallworth and J. W. Thomson.

Temp. commissions (R.N.V.R.) have been granted to the following, seniority as stated:—Lieuts.—W. A. Johnson and S. E. Ould, June 23rd; Sub-Lieuts. A. Pratt and T. P. Francis, June 25th.

London Gazette, June 26th.

To be Temp. Ob. Lieuts.: R. G. St. John, Feb. 7th, 1916; H. Furniss R. W. Gow, D.S.C.; June 30th, 1916. E. F. Turner; Aug. 2nd. F. J. Dean. J. A. Macnab; Oct. 5th. J. L. Kerry, D.S.C.; A. W. C. Holcombe; D. C. Evans; April 1st.

To be Temp. Ob. Sub-Lieuts.: D. S. Earp, A. D. Rogers; Jan. 1st, 1916. E. B. C. Betts, D.S.C., R. M. Inge, C. L. Hains; Jan. 31st, 1916. G. H. Courtenay-Luck, G. E. Wright, W. C. Jameson; Mar. 20th, 1916. F. W. Mardock; Mar. 27th, 1916. B. C. Morley; April 15th, 1916. V. Greenwood; April 29th, 1916. F. H. Isaac; May 20th, 1916. C. N. Downes, L. V. Pearkes; May 29th, 1916. E. J. Travers, P. Brewsher, W. C. Parker, D. R. W. Thompson, C. O. Palmer, W. R. Abbott, A. O. Jones; July 12th J. C. A. Jenks, R. W. Frazier, D. P. Rowland, E. W. C. Corry, N. H. Starbuck; Aug. 31st. G. A. Richardson, C. K. Chase, D.S.C.; Oct. 21st. L. E. Nicholson, E. G. Hutton, A. C. Stevens; Nov. 10th. J. W. Young; Jan. 1st. A. I. Hutty, A. A. N. Haywood, C. Chapman, R. St. H. Clarke, G. E. Elliott; Mar. 6th. L. Marsh; Mar. 28th. E. A. Planterose; April 3rd. W. L. Amos; April 6th. N. McCrirrick; April 12th. F. S. S. Wates, L. J. Bennett; April 21st. F. L. Morrison, S. S. Tyler, C. A. Stephenson; April 28th. R. Redfern; May 6th. D. G. McGregor, L. Ritson, A. W. C. Cartwright; May 12th. W. S. Anderson, C. B. Orfeur; May 27th. C. S. Fox; May 28th H. Slaney: June 14th.

Actg. Sub-Lieut. B. A. Malet, R.N.R., has been graded as Ob. Sub-Lieut., to date Jan. 1st, 1916.

Admiralty, June 28th.

Actg. 2nd Corpl. A. H. Woodward entered as Prob. Flight Officer, seniority May 30th, and appointed to "President," additional, for R.N.A.S.

Ord. Seaman (R.N.V.R.) R. S. S. Orr entered as Prob. Flight Officer, seniority July 8th, and appointed to "President," additional, for R.N.A.S.

W. B. Mattinson entered as Prob. Flight Officer, seniority June 20th, and appointed to "President," additional, for R.N.A.S.

Admiralty, June 29th.

W. A. E. Lea and A. E. Wolveridge both entered as Warrant Officers (Temp.), 2nd grade, seniority May 21st.

London Gazette, June 29th.

The following promotions have been made, to date June 30th.

Royal Navy.

Comdrs. to be Capts.: R. M. Groves, H. D. Briggs.

Lieut.-Comdrs. to be Comdrs.: F. C. Halahan, M.V.O.

Wing Comdrs. to be Wing Capts.: F. C. Halahan, M.V.O., H. D. Briggs (Actg. Wing Capt.), H. P. Smyth-Osbourne.

Sqdn. Comdrs. to be Wing Comdrs.: D. A. Oliver, D.S.O., A. Ogilvie (Act. Wing Comdr.), Hon. C. M. P. Brabazon, F. W. Bowhill, E. D. M. Robertson, J. T. Cull, D.S.O., H. A. Williamson, H. M. Cave-Browne-Cavé, J. R. W. Smyth-Pigott, D.S.O.

Squadron Comdr. to be Act. Wing Comdr.: F. K. McClean.

Flight-Comdrs. to be Sqdn. Comdrs.: F. G. Brodribb (Actg. Sqdn. Comdr.), T. D. Mackie, H. E. M. Watkins, R. C. M. Pink, T. W. Elsdon, E. V. S. Wilberforce, J. Dunville, C. F. Pollock, R. C. Hayes, R. S. Robinson, R. J. J. Hope-Vere (Actg. Sqdn. Comdr.), R. Whitehead, G. L. Thomson, D.S.C., A. K. Robertson, B. F. Fowler, D. Harries, G. H. Scott, K. S. Savory, D.S.O., T. H. England, D.S.C., V. Nicholl, D.S.C., B. L. Huskisson, D.S.C., E. H. Dunning, D.S.C., The Hon. R. Coke, H. N. M. Hardy, D.S.O., J. I. Harrison, F. J. Rutland, D.S.C., R. S. Dallas, D.S.C.

Flight-Lieuts. to be Flight-Comdrs.: F. M. L. Barr, W. H. S. Garnett, W. K. F. G. Warneford, G. E. Livock, F. G. Andreae, C. B. Dalison (Actg. Flight-Comdr.) H. C. Morris, J. D. Newberry (Actg. Flight-Comdr.), F. T. Dirby, D.S.C., C. E. Wood (Actg. Flight-Comdr.), D. W. A. Barton, J. B. P. Ferrand, D.S.O., J. S. F. Morrison, F. G. D. Hards, D.S.C., R. C. Hardstaff (Actg. Flight-Comdr.), T. C. Vernon (Actg. Flight-Comdr.), A. F. F. Jacob F. Fowler, D.S.C. (Actg. Flight-Comdr.), A. R. Cox (Actg. Flight-Comdr.), C. T. MacLaren (Actg. Flight-Comdr.), C. D. Morrison (Actg. Flight-Comdr.), J. R. Davison, E. S. Crips, B. C. Windeler, A. H. Chandler, E. A. O. Auldjo-Jamieson, D. R. Thurstan, W. H. Dunn, E. M. Everett (Actg. Flight-Comdr.), R. B. Munday (Actg. Flight-Comdr.), G. H. Jackson (Actg. Flight-Comdr.), M. A. Simpson, J. S. Wheelwright, B. P. H. de Roeper (Actg. Flight-Comdr.), R. F. S. Leslie, F. H. M. Maynard (Actg. Flight-Comdr.), F. J. Linnell, W. H. Watt, L. D. Morrison, W. F. Horner, A. W. Mylne, R. A. Cochrane, R. S. Booth, G. M. Thomas, C. J. Galpin, J. G. Struthers, R. S. Smith, S. St. G. C. Belfield, C. L. Scott, J. B. Cole-Hamilton, H. K. Thorold, D.S.C. (Actg. Flight-Comdr.), E. W. Norton, D.S.C. (Actg. Flight-Comdr.), E. Cadbury, D.S.C., S. Bell, B. C. Clayton (Actg. Flight-Comdr.), C. MacLaurin, C. T. Freeman, D.S.C., G. V. Leather, C. H. Hayward (Actg. Flight-Comdr.), C. C. R. Edwards, D.S.C. (Actg. Flight-Comdr.), H. E. Crawfurd, H. G. Brackley, D.S.C. (Actg. Flight-Comdr.), S. O. Smith, S. J. Goble, D.S.O., D.S.C. (Actg. Flight-Comdr.), F. E. Sandford, G. E. Hervey (Actg. Flight-Comdr.), M. R. Buckland, H. G. Travers (Actg. Flight-Comdr.), W. Tesh, H. G. R. Malet, A. Gammon, K. C. Buss, T. F. Le Mesurier, D.S.C. (Actg. Flight-Comdr.), W. G. McMinnies (Actg. Flight-Comdr.), I. N. C. Clarke, D.S.C. (Actg. Flight-Comdr.), E. T. Bradley, R. J. O. Compston, D.S.C. (Actg. Flight-Comdr.), W. E. Gardner, D.S.C. (Actg. Flight-Comdr.), C. D. Booker (Actg. Flight-Comdr.), A. M. Shook (Actg. Flight-Comdr.), L. S. Breadner, D.S.C. (Actg. Flight-Comdr.).

Flight Sub-Lieuts. to Flight-Lieuts.: C. H. M. Chapman, M. Birkbeck, L. P. Paine, C. N. Geale, A. F. Marlowe, S. M. Kinkead, L. Edwards (Actg. Flight-Lieut.), R. E. Darnton, H. J. T. Saint, A. T. Sketchley, G. C. V. Hewson, W. E. Traynor, H. E. Weaver, C. H. B. Jenner-Parson, C. D. Newman, G. H. Bittles, A. J. H. MacColl, R. F. Maitland, R. E. V. Jeliffe, P. D. Robertson, H. Tether (Actg. Flight-Lieut.), C. E. Rich, H. V. Terry, F. A. Best, J. F. Hart, G. K. Blandy, J. W. Hobbs, H. G. Leslie, A. G. Woodward, J. F. Dixon, J. R. Crouch, E. C. H. Tebb, B. W. Hemsley, G. W. Biles, C. E. Burden, O. M. Ayrton, E. B. Waller, J. E. Barrs, L. Whitworth, J. A. Page, E. J. Cuckney, D.S.C., J. S. N. Rockey, S. J. Woolley, G. L. Hartgill, D. E. Harkness, D.S.C., J. H. Woolner, D. C. Waylen, F. S. Cotton, J. O. Galpin, F. Towers, F. C. Armstrong, R. F. Redpath, J. H. Keens, M. C. Wood, M. G. Dover, V. H. Ramsden, R. Leckie, D.S.C., C. E. Roach-Smith, B. N. Harrop, J. de Francia, A. H. H. Gilligan (Actg. Flight-Lieut.), B. D. Hobbs, D.S.C., W. E. Robinson, E. Boynton, A. J. Chadwick, P. G. McNeil, H. A. H. Leetham, A. S. Elliott, G. L. Nicholls, P. L. Bryant, F. P. Collins, R. Collishaw, C. B. de T. Drummond, W. J. Calderwood, G. A. Magor, G. R. Hodgson, J. L. Gordon, E. J. B. How. (Actg. Flight-Lieut.), H. L. Everitt (Actg. Flight-Lieut.), N. H. Fletcher, J. S. T. Fall, D.S.C., D. M. Ballantyne, J. E. Sharman, D.S.C., A. H. Pearce, D. G. Donald (Actg. Flight-Lieut.), G. D. Kirkpatrick, H. G. Nares, R. E. Spear, R. R. Winter, C. G. Bronson, C. McNicoll, D.S.C., D. B. M. Hume, J. E. A. Hoare, V. R. Scriven, W. M. Alexander, A. F. Brandon, H. T. Mellings, D.S.C., H. S. Broad, C. Gilmour, R. R. Thornely, J. E. Scott, L. H. Rochford, W. H. Richardson, J. E. Brewin.

Ob. Sub-Lieuts. to be Ob. Lieuts.: G. H. C. Luck, N. H. Starbuck, G. A. Richardson.

Warrant Officers, 2nd Grade, to be Warrant Officers, 1st Grade: H. C. Bobbett, F. Everett, W. F. Floyd, C. King, L. R. Staddon, J. V. Collins, P. H. Hunter, N. Littlejohn, F. Susans, D. E. Shaw, T. Marchant, G. J. Squires, A. Deakin, W. G. Coleman, B. S. Brice, J. C. Andrews, F. J. Hooper, F. Edwards. W. C. England.

Admiralty, July 2nd.

Lieut. R. B. Maycock graded as a Prob. Flight-Comdr., seniority June 30th. Sub-Lieut. (Prob. Flight Sub-Lieut.) E. B. Devereux promoted to rank of Actg. Lieut., seniority June 15th.

Prob. Flight Officer S. T. Freeman promoted to rank of Flight Sub-Lieut., seniority April 30th.

The following Prob. Flight Officers (Temp.) have been promoted to rank of Flight Sub-Lieut. (Temp.), seniority as stated: S. W. Rosevear; April 21st J. L. Stocks, S. J. C. Ellis and A. G. Raven; May 6th. D. R. B. Bentley, M. S. Varden, T. B. Holmes, W. E. B. Oalkey and H. L. Macro; May 22nd. L. L. King, K. V. Turney, T. L. Glasgow, G. B. G. Scott, W. N. Smith, W. C. Johnson, A. W. Phillips, G. Goodhart and W. B. E. Powell.

The following Prob. Flight Sub-Lieuts. (Temp.) have been confirmed in rank with original seniority: G. H. D. Gossip, A. Macdonald and E. H. Snell.

Lieut. (R.N.V.R., Temp.) G. H. Millar entered as Prob. Flight Ob. Officer (Temp.), seniority June 17th.

The following have been entered as Prob. Flight Officers (Temp.), seniority as stated: Y. H. Sowter, S. C. Stafford, V. C. M. Tiarks, G. Tucker, B. H. Parham, C. S. Devereux, C. L. W. Brading, K. H. Carr, E. J. Collins, A. S. Coombe, H. A. Crump, G. Dymore-Brown, W. H. Easty, P. K. Glazebrook, A. L. Godfrey, R. B. Hunter, G. H. Ingram, E. G. Jones, L. H. N. Langworthy, J. H. Leavesley, R. F. Levy, E. W. Logsdail, L. C. Messiter, H. K. Moir, H. Rudd, R. G. Shaw, R. D. Slater and J. L. Smith; June 24th. G. Verden; June 25th.

G. L. Tyser granted a temp. commission as Lieut. (R.N.V.R.), seniority June 28th.

Royal Flying Corps (Military Wing).

London Gazette, June 26th.

The following to be Temp. 2nd Lieut.:—

For duty with R.F.C.: Sergt. H. A. Milnes, from R.E.; May 25th.

Special Appointment.

Graded for purposes of Pay as a Staff Captain whilst Commanding a Squadron, R.F.C. Cadet Wing.—Capt. J. B. Batten, D.S.O., R. Fus., S.R., and to be secd.; May 28th.

Flying Officers.—Temp. 2nd Lieut. J. Metcalfe, Gen. List; April 29th. Temp. Capt. G. W. Frost, Notts and Derby R.; May 27th. Temp. 2nd Lieut. (on prob.) A. V. Campbell, Gen. List; May 28th. Lieut. K. B. Conn, Can. Exped. Force; May 30th. Temp. Capt. A. R. Thomson, M.C., York. R., and to be transfd. to Gen. List; Lieut. G. D. Crowther, Can. Art.; May 31st. Temp. 2nd Lieut. (on prob.) W. P. Delamere, Gen. List; June 2nd.

Park Commander.—Temp. Capt. A. K. Hall, Gen. List, from an Equipment Officer, 1st Cl., and to be Temp. Major whilst so employed; June 1st.

Equipment Officers, 3rd Class.—Temp. 2nd Lieut. (on prob.) F. J. W. Humphreys, Gen. List; April 21st. 2nd Lieut. E. Porter, Som. L.I.; 2nd Lieut. C. Mullen; June 1st. The appointment of Temp. 2nd Lieut. H. S. Wildeblood, Gen. List, notified in the *Gazette* of June 1st, is antedated to Feb. 4th.

Memorandum.—Sergt.-Major H. V. Page, from R.F.C., to be 2nd Lieut. for duty with R.F.C.; May 15th.

Supplementary to Regular Corps.—2nd Lieut. (on prob.) W. M. Smith resigns his commission; June 27th. The relinquishment of his commission by 2nd Lieut. D. Brooks, notified in the *Gazette* of May 18th, is cancelled. 2nd Lieuts. (on prob.) confirmed in their rank: D. R. Munro, F. Scarborough, C. H. F. Nobbs, N. A. Burritt, J. L. Boles, C. B. van Leenhof, A. R. Holthouse, C. M. Ross, F. P. Watts, S. J. Gardiner, J. L. Drummond, I. M. Maclean, J. L. Cuthbertson, C. D. Fairweather, R. H. Richardson, L. R. Howland, A. McD. Hamilton. E. C. Clark to be 2nd Lieut. (on prob.); Feb. 27th (substituted for the notification under "General List, R.F.C.," in *Gazette* of Mar. 8th).

General List, R.F.C.—The following Cadets to be Temp. 2nd Lieuts. (on prob.): W. C. Brown, S. Buckenham, H. W. Connell, E. L. Girling, C. H. Hartley, H. S. Hayward, G. H. Knight, G. F. Langford, J. G. Pagdin, R. T. Penn, B. G. Porter, J. Powell, H. E. Riley, H. M. Robertson, W. B. Shelton, H. S. Terrell, F. P. Watson, F. Weston, G. N. Whitehead, H. V. Williams, G. Wrapson; May 25th. C. R. Campbell, J. S. Geddes, J. Hunt, A. J. Moore, F. R. S. Southon, F. G. W. Taylor, G. Andrews, E. E. Ashton, C. E. J. Barbour, B. F. Braithwaite, J. F. Bremmer, A. H. F. Brothers, V. W. Burgess, G. Carruthers, M. H. Cleary, W. E. Davies, F. W. Evans, J. Francis, K. G. P. Hendrie, L. H. Higgs, F. H. Hiscock, M. E. Holyroyd, L. C. Hooton, W. H. Jackson, T. R. Jarvie, T. L. Johnson, G. G. Johnstone, A. C. F. Luke, C. R. Maasdrop, R. MacDonald, D. W. Mason, G. T. C. May, A. G. McNeil, C. E. Ogden, H. E. M. Owen, E. S. C. Pearce, A. H. P. Pehrson, E. G. A. Peskett, T. B. Pritchard, F. A. Pumphrey, J. Ring, W. A. Roberts, T. N. P. Stack, M. G. W. Stewart, C. R. Smythe, E. Taylor, H. K. P. Tiddy, W. L. Vorster, G. H. Whyte, G. B. Wigle, H. H. Wilson, A. F. Woodward-Gregory, J. Wynn, A. Carter; May 30th.

London Gazette Supplement, June 27th.

The following temp. appointment is made at the War Office :—

Staff Lieutenant.—Capt. E. S. Skipper, R.F.C., S.R., from an Equipment Officer, 3rd Cl., R.F.C.; June 7th.

Flight-Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed: Temp. 2nd Lieut. L. S. White, M.C., Gen. List; May 3rd. Temp. Lieut. C. G. Rushton, Gen. List; May 30th. Temp. Lieut. F. D. Stevens, Gen. List; 2nd Lieut. W. C. Campbell, S.R.; June 9th. Temp. Lieut. A. E. Illingworth, Gen. List; June 11th. 2nd Lieut. (Temp. Lieut.) R. M. Findlay, Yeo. (T.F.); June 15th.

Flying Officers (Observers).—2nd Lieut. N. M. Pizey, Yeo. (T.F.), seniority Feb. 22nd, and to be secd.; 2nd Lieut. F. R. Martin, R. Sc. Fus., seniority Mar. 5th, and to be secd.; Lieut. F. Leathley, R. Innis. Fus., seniority Mar. 6th, and to be secd.; June 8th. Temp. Lieut. A. H. Mearns, R. Highrs., and to be transfd. to Gen. List; 2nd Lieut. N. R. Rayner, W. York. R., and to be secd.; June 8th, seniority Mar. 10th. Temp. Lieut. C. H. Sands, Notts and Derby R.; June 8th, seniority Mar. 11th. Temp. 2nd Lieut. A. D. K. Craig, attd. R. Scots, and to be transfd. to Gen. List; June 7th, seniority Mar. 28th. Temp. 2nd Lieut. C. R. Thomas, attd. Bedf. R., and to be transfd. to Gen. List; June 8th, seniority April 7th.

Balloon Commanders (graded as Balloon Officers).—From Balloon Officers: Temp. Capt. H. V. Knox, Gen. List; May 25th. 2nd Lieut. R. H. P. Hayward, R.A., and to be Temp. Lieut. while so employed; May 30th.

Equipment Officers, 1st Class.—From the 2nd Cl., and to be Temp. Capts. whilst so employed:—June 1st: 2nd Lieut. (Temp. Lieut.) R. K. C. Maguire, S.R.; 2nd Lieut. (Temp. Lieut.) C. N. Seemann, S.R. 2nd Cl.:—From the 3rd Cl.: Temp. 2nd Lieut. W. H. Gouldstone, Gen. List, and to be Temp. Lieut. whilst so employed; May 1st. Major R. A. Constantine, York. R. (T.F.); June 1st. From the 3rd Cl., and to be Temp. Lieuts. whilst so employed: 2nd Lieut. W. T. Curtis, S.R.; 2nd Lieut. C. H. Boyle, S.R.; Temp. 2nd Lieut. C. L. Mitchell, Gen. List.

London Gazette Supplement, June 28th.

Flying Officers.—Temp. 2nd Lieut. A. J. Watson, attd. Manch. R., and to be transfd. to Gen. List; Mar. 20th. 2nd Lieut. P. Ainsworth, Manch. R. (T.F.), from a Flying Officer (Ob.); April 7th, seniority Oct. 8th. Lieut. G. L. Stedman, Canterbury Mtd. Rif., N. Zealand Mil. Forces; April 13th. Temp. Lieut. W. Shields, Manch. R.; April 17th. Temp. Lieut. N. Sharples, A.S.C., and to be transfd. to Gen. List; April 22nd. 2nd Lieut. H. E. T. Crocker, Ind. Army Res. of Off., from a Flying Officer (Ob.); April 30th, seniority Aug. 14th. Temp. 2nd Lieut. F. Hyde, Gen. List; May 6th. Temp. 2nd Lieut. G. W. Ferguson, Gen. List; May 8th. 2nd Lieut. (on prob.) C. Knowles, S.R.; May 9th. 2nd Lieut. (on prob.) G. D. Eckardt, S.R.; May 11th. 2nd Lieut. (Temp. Lieut.) A. F. Bird, Norf. R. (T.F.), and to be secd.; May 12th. Temp. Lieut. A. L. Fleming, D. of Corn. L.I., and to be transfd. to the Gen. List; May 13th. Temp. Lieut. B. R. Apps, A.S.C., and to be transfd. to Gen. List; May 15th. Capt. R. H. Hawkins, S. Staff. R., S.R., from A. Cyclis. Corps; May 17th. Temp. 2nd Lieut. W. P. Hawgood, Gen. List; May 22nd Temp. 2nd Lieut. D. H. Oliver, Gen. List; May 23rd. Temp. 2nd Lieut. J. B. Fox, Gen. List; May 24th. Temp. 2nd Lieut. (on prob.) A. L. Cumming, Gen. List; May 25th. Lieut. L. H. L. Lindsay-Young, R. Sc. Fus., and to be secd.; Temp. 2nd Lieut. H. F. Fulford, R.E.; Temp. 2nd Lieut. F. Matthews, Gen. List; 2nd Lieut. (on prob.) E. S. Meek, S.R.; Temp. 2nd Lieut. (on prob.) W. Chivers, Gen. List; Temp. 2nd Lieut. (on prob.) K. A. W. Leighton, Gen. List; June 4th. Temp. 2nd Lieut. A. Davies, attd. N. Staff. R., and to be transfd. to Gen. List; 2nd Lieut. (on prob.) J. Baalman, S.R.; Temp. 2nd Lieut. (on prob.) G. Russell, Gen. List; June 5th. Temp. 2nd Lieut. (Temp. Lieut.) J. P. Colin, Gen. List, from a Flying Officer (Ob.); June 6th, seniority Aug. 10th. 2nd Lieut. (Temp. Lieut.) A. L. M. Van der Byl, R.F.A., S.R., from a Flying Officer (Ob.), seniority Sept. 13th; Temp. 2nd Lieut. E. C. J. Elliott, Gen. List, from a Flying Officer (Ob.), seniority June 3rd, 1916; Temp. 2nd Lieut. (on prob.) P. L. Smith, Gen. List; 2nd Lieut. (on prob.) J. H. C. Nixon, S.R.; 2nd Lieut. (on prob.) W. L. Harrison, S.R.; Temp. 2nd Lieut. (on prob.) W. H. Maturin, Gen. List; Temp. 2nd Lieut. (on prob.) R. G. Wood, Gen. List; June 7th. Temp. 2nd Lieut. (on prob.) C. B. Simpson, Gen. List; June 8th.

Balloon Officer.—2nd Lieut. I. Morgan, R.F.A. (T.F.), and to be secd.; June 10th.

Equipment Officers, 1st Class.—2nd Lieut. (Temp. Lieut.) N. C. F. Francis, S.R., from the 2nd Cl., and to be Temp. Capt. whilst so employed; May 26th.

2nd Class.—2nd Lieut. W. T. Hanson, S.R., from the 3rd Cl., and to be Temp. Lieut. whilst so employed; Mar. 15th.

3rd Class.—2nd Lieut. J. Bullock, Som. L.I.; 2nd Lieut. D. Mitchell; Temp. 2nd Lieut. (on prob.) F. E. P. Langton, Gen. List; Temp. 2nd Lieut. A. E. Lindon, Gen. List; Temp. 2nd Lieut. E. F. Moulder, Gen. List; Temp. 2nd Lieut. F. T. Wheatley, Gen. List; June 6th.

Memoranda.—Lieut. H. J. Lister, Def. Force of the Union of S. Africa, to be Temp. Lieut., for duty with R.F.C.; April 4th, seniority Nov. 19th, 1914.

To be Temp. Lieuts. while serving with R.F.C.: 2nd Lieut. T. M. McKenna, Hrs., S.R.; Aug. 23rd. Temp. 2nd Lieut. G. H. Wilkinson; Temp. 2nd Lieut. E. L. L. Turnbull, R.E.; 2nd Lieut. C. G. Stewart; R. Sco. Fus.; Temp. 2nd Lieut. F. A. Matthews, R. Suss. R.; Temp. 2nd Lieut. M. G. Jones, M.C., North'd. Fus.; 2nd Lieut. (Actg. Lieut.) G. C. Smith, M.C., A.S.C.; Temp. 2nd Lieut. D. P. Farley, R.W. Surr. R.; Temp. 2nd Lieut. G. E. Ransom, attd. R. Fus.; Temp. 2nd Lieut. L. N. Hollinghurst, Middx. R.; 2nd Lieut. A. M. N. de Lavison, Lond. R. (T.F.); 2nd Lieut. W. Roger, Arg. and Suthd. Highrs. (T.F.); Temp. 2nd Lieut. E. B. Hamel; Temp. 2nd Lieut. W. A. Wright; Temp. 2nd Lieut. G. A. Wilding; Temp. 2nd Lieut. E. Mycock. Temp. 2nd Lieut. K. L. Martinson; Temp. 2nd Lieut. W. S. Spence; Temp. 2nd Lieut. A. N. Donnet; Temp. 2nd Lieut. J. T. G. Murison; Temp. 2nd Lieut. H. L. M. Dodson; May 1st.

Supplementary to Regular Corps.—The following 2nd Lieuts. (on prob.) are confirmed in their rank: H. H. Maudslay, R. Bassett and F. W. Memory.

London Gazette Supplement, June 29th.

Flight-Commanders.—From Flying Officers: Capt. A. Somervail, M.C., K.O. Sco. Bord. (T.F.); Mar. 31st. Lieut. R. H. Marshall, North'n. R., S.R., and to be Temp. Capt. whilst so employed; April 20th. From Flying Officers, and to be Temp. Capts. whilst so employed: Temp. Lieut. F. Sharpe, Notts and Derby R.; June 3rd. Lieut. I. P. R. Napier, Arg. and Suth'd. Highrs. (T.F.); June 5th. Temp. Lieut. A. V. Burlton, Gen. List; June 6th. Temp. Lieut. C. J. Dickinson, Gen. List; 2nd Lieut. J. B. Home-Hay, Arg. and Suthd. Highrs. (T.F.); Temp. 2nd Lieut. W. A. McClatchie, Gen. List; June 7th. Temp. 2nd Lieut. C. C. Sharp, Gen. List; June 8th. 2nd Lieut. (Temp. Lieut.) J. L. M. de C. Hughes-Chamberlain, Suff. R., and to be secd.; June 12th.

Flying Officers.—Temp. Capt. C. L. E. Geach, Gen. List; April 27th, seniority July 28th, 1915 (substituted for the notification in the *Gazette* of May 18th). Temp. 2nd Lieut. C. H. Clifford, Gen. List; Feb. 28th. Temp. 2nd Lieut. F. E. Neily, Gen. List; May 6th. Temp. 2nd Lieut. J. McDougall, Gen. List, from a Flying Officer (Ob.), seniority Sept. 6th; May 9th. Lieut. H. B. Burgess, C. Gds., S.R.; May 11th. Lieut. H. E. C. Collins, C. Gds., S.R.; May 12th. 2nd Lieut. (on prob.) F. C. Andrews, S.R.; May 15th. Lieut. K. M. Rodger, Arg. and Suthd Highrs. (T.F.), and to be secd.; May 22nd. 2nd Lieut. O. D. Hay, Gord. Highrs. (T.F.), and to be secd.; June 1st. Lieut. W. B. Farrington, Notts and Derby R., S.R., from a Flying Officer (Ob.); June 2nd, seniority Aug. 1st. 2nd Lieut. G. L. C. Clifton, S.R.; June 3rd. 2nd Lieut. (Temp. Lieut.) F. Surgey, A. Cyclist Corps, from a Flying Officer (Ob.), seniority Oct. 15th; 2nd Lieut. A. N. Maplestone, S.R.; Temp. 2nd Lieut. (on prob.) T. J. Benson, Gen. List; June 4th. 2nd Lieut. H. M. Whitcut, S. Staff. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) G. A. Wood, Gen. List; Temp. 2nd Lieut. (on prob.) S. A. Gilray, Gen. List; Temp. 2nd Lieut. (on prob.) A. D. Martin, Gen. List; Temp. Lieut P. H. Cummings, Sea. Highrs.; Lieut. S. A. Hustwitt, Can. Engrs.; June 5th. Capt. T. F. W. Thompson, Welsh R., S.R., and to be secd.; 2nd Lieut. (Temp. Lieut.) R. H. Cross, Yeo. (T.F.), and to be secd.; 2nd Lieut. L. C. Hornabrook, S.R.; June 6th. Temp. 2nd Lieut. (on prob.) D. H. Morris, Gen. List; Lieut. C. V. F. Jeffery, Can. Inf.; June 7th. 2nd Lieut. W. G. Meggitt, M.C., Welsh R., from a Flying Officer (Ob.), seniority Aug. 26th; Temp. 2nd Lieut. (on prob.) H. V. Thompson, Gen. List; Temp. 2nd Lieut. (on prob.) H. H. Whytehead, Gen. List; June 8th. Capt. A. E. Sargison, Can. Art.; Temp. Lieut. R. Goudie, High. L.I., from a Flying Officer (Ob.), seniority Aug. 17th; Temp. 2nd Lieut. (on prob.) E. C. Rylands, Gen. List; Capt. G. I. Paterson, Can. Inf. Temp. Lieut. R. G. Rolfe-Rogers, attd. Worc. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) J. G. Moore, Gen. List; Temp. 2nd Lieut. (on prob.) E. J. A. Burke, Gen. List; Temp. 2nd Lieut. (on prob.) L. G. Brazier, Gen. List; June 9th. Temp. 2nd Lieut. H. Fall, Gen. List; June 10th.

Flying Officers (Observers).—Lieut. R. C. Morgan, Can. Art., from Oct. 21st, 1915, to Nov. 15th, 1916; 2nd Lieut. (Temp. Lieut.) H. J. Buchanan-Wollaston, Yeo. (T.F.); Sept. 3rd, seniority Aug. 20th. Lieut. J. A. B. Lane, Hrs., from Res. Regts. of Cav., and to be secd.; Mar. 30th, seniority Jan. 9th. Temp. Capt. G. Davies, A.S.C., and to be transfd. to Gen. List; May 26th, seniority Jan. 23rd. Temp. 2nd Lieut. R. H. Barratt, attd. Middx. R., and to be transfd. to Gen. List; June 10th, seniority Feb. 8th. Lieut. (Actg. Capt.) V. Buxton, Leic. R., to relinquish his actg. rank and to be secd.; May 15th, seniority Feb. 15th. 2nd Lieut. (Temp. Lieut.) H. B. Hamilton, High. L.I. (T.F.), seniority Feb. 17th, and to be secd.; Temp. 2nd Lieut. (on prob.) H. V. Jones, Gen. List, seniority Mar. 19th; Lieut. A. L. Stovel, Can. Inf., seniority April 6th; Capt. D. C. Sheppard, Can. Inf., seniority April 22nd; Temp. 2nd Lieut. (on prob.) R. A. Harting, Gen. List, seniority April 23rd; May 26th. The initials of Lieut. E. T. Caulfield-Kelly, R. Dublin Fus., are as now described, and not as in the *Gazette* of June 11th.

Balloon Officer.—2nd Lieut. E. P. Fletcher, R.F.A., S.R.; April 29th.

Equipment Officers, 3rd Class.—Temp. Lieut. H. J. Lister, Gen. List; April 4th. 2nd Lieut. (on prob.) F. C. E. Dimmick, S.R.; April 30th. 2nd Lieut. T. Bell; May 11th. Temp. 2nd Lieut. E. T. L. Jones, Gen. List; 2nd Lieut. A. B. Smith, S.R.; June 4th. 2nd Lieut. R. Bassett, S.R.; Temp. 2nd Lieut. A. H. Desforges, Gen. List; 2nd Lieut. F. Freeman, S.R.; Temp. 2nd Lieut. (on prob.) E. H. Hart, Gen. List; 2nd Lieut. F. W. Memory, S.R.; Temp. 2nd Lieut. C. G. Nops, Gen. List; 2nd Lieut. F. J. Farlow, S.R.; Temp. 2nd Lieut. (on prob.) P. H. Benson, Gen. List; Temp. 2nd Lieut. W. H. Botterill, Gen. List; Temp. 2nd Lieut. A. J. Bright, Gen. List; 2nd Lieut. H. W. Henchie, S.R.; Temp. 2nd Lieut. A. H. Herrington, Gen. List; 2nd Lieut. H. W. Brooks, S.R.; 2nd Lieut. H. Jaffe, S.R.; 2nd Lieut. T. J. Organ, S.R.; 2nd Lieut. L. C. Owen, S.R.; 2nd Lieut. H. R. Williamson S.R.; 2nd Lieut. F. D. Crane, S.R.; Temp. 2nd Lieut. H. W. Halifax, Gen. List; Temp. 2nd Lieut. F. G. Sherlock, Gen. List; 2nd Lieut. T. P. Shillcock, S.R.; Temp. 2nd Lieut. E. C. Steel, Gen. List; 2nd Lieut. F. W. Brooks, S.R.; 2nd Lieut. R. O. Clark, S.R.; 2nd Lieut. J. Hobbs, S.R.; 2nd Lieut. H. H. Maudslay, S.R.; 2nd Lieut. T. E. Mills, S.R.; Temp. 2nd Lieut. (on prob.) F. B. Woods, Gen. List; Temp. 2nd Lieut. J. W. Atkinson, Gen. List; 2nd Lieut. R. T. Belville, S.R.; 2nd Lieut. A. G. A. Bute, S.R.; Temp. 2nd Lieut. R. C. Clements, Gen. List; 2nd Lieut. G. M. Edmonston, S.R.; 2nd Lieut. O. T. Stone; June 6th.

Memoranda.—Flight-Lieut. C. L. E. Geach, from R.N.A.S., to be Temp. Capt. for duty with R.F.C.; April 27th, seniority July 28th, 1915 (substituted for the notification in *Gazette* of May 17th).

Temp. 2nd Lieut. (Temp. Lieut.) R. H. Sievwright, Gen. List, to be Temp. Capt. whilst employed under R.F.C.; April 12th.

2nd Lieut. F. L. Royle, Yorks. L.I. (T.F.), to be Temp. Capt. (without the pay or allowances of that rank) whilst espcially employed under the R.F.C.; May 9th.

To be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: R. E. L. Bristow; April 26th. Hon. Lieut. S. J. Elliott, late Lieut. Northd. Fus.; June 10th. C. A. Perry; June 11th. Pte. R. D. Wakeham, from O.T.C.; June 14th. R. Leedal, J. M. Moore, G. H. Johnson, C. B. Newman, W. P. W. Smith, E. W. Hooton-Smith, G. Johnson, J. H. B. Porter, F. L. Goodacre, F. Le B. Egerton, P. F. Dorté, A. W. Cordrey, F. J. F. English, F. R. T. Pearson, J. de la M. C. Rowley, A. W. H. Osborne, W. T. Close, E. P. Donaldson and S. R. Moore; June 30th.

Supplementary to Regular Corps.—2nd Lieuts. (on prob.) confirmed in their rank: H. W. Henchie, T. E. Mills, J. Hobbs, F. D. C. Gore, R. O. Clark, L. C. Hornabrook, J. H. C. Nixon, A. N. Maplestone, G. L. C. Clifton, H. W. Brooks, F. D. Crane, A. G. A. Bute, R. T. Belville, G. M. Edmondston, F. W. Brooks, T. P. Shillcock, L. C. Owen, R. H. Williamson, H. Jaffe, T. J. Organ, F. J. Farlow, E. M. V. Fielding, G. D. Eckardt, J. S. Reid, A. R. Jones, E. C. Johnston, M. J. Clark, A. S. Bmith, J. Baalman, W. L. Harrison, W. H. Weller, W. G. Preston, S. C. Foster and F. Freeman.

London Gazette Supplement, June 30th.

Flying Officers.—Temp. 2nd Lieut. C. A. Angrave, Gen. List; April 19th, 2nd Lieut. (Temp. Capt.) E. G. Baxter, Ind. Army Res. of Off.; May 16th. 2nd Lieut. S. C. Foster, S.R.; May 17th. Temp. 2nd Lieut. C. G. V. Runnels-Moss, Gen. List; June 4th. Temp. 2nd Lieut. A. L. Sinclair, from Temp. Lieut. Res. Regts. of Cav., and to be transfd. to Gen. List; June 6th. Lieut. N. McLeod, Can. Art.; Temp. 2nd Lieut. (on prob.) J. H. Russell, Gen. List; Lieut. R. T. Leighton (T.F.), and to be secd.; 2nd Lieut. (Temp. Lieut.) R. T. Minors, Worc. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) A. Champion, Gen. List; 2nd Lieut. A. R. Jones, S.R.; June 7th. Temp. 2nd Lieut. (on prob.) D. F. Farrar, Gen. List; Temp. 2nd Lieut. (on prob.) E. E. Turner, Gen. List; Temp. 2nd Lieut. (on prob.) P. C. Norton, Gen. List; June 11th. 2nd Lieut. (on prob.) A. McD. McBain, S.R.; Temp. 2nd Lieut. (on prob.) N. H. Crow, Gen. List; Temp. 2nd Lieut. (on prob.) J. C. Lowenstein, Gen. List; June 12th.

Flying Officers (Observers).—Temp. 2nd Lieut. G. J. Armitage, R.A., seniority Feb. 13th, and to be transfd. to Gen. List; Temp. Lieut. G. Mutch, D.S.O., Gord. Highrs., seniority Feb. 22nd, and to be secd.; June 9th. 2nd Lieut. G. Curgenven, Yeo. (T.F.), and to be secd.; May 1st, seniority Feb. 28th. 2nd Lieut. E. S. Jacobs, R. Mon. R.E., S.R., seniority Mar. 2nd; 2nd Lieut. G. B. Morse, R. W. Fus. (T.F.), seniority March 4th, and to be secd.; 2nd Lieut. G. Allsop, Notts and Derby R. (T.F.), seniority Mar. 6th, and to be secd.; June 9th. 2nd Lieut. A. D. Walker, S. Lan. R., and to be secd.; June 10th, seniority Mar. 19th. Lieut. H. W. Richardson, Can. Inf., seniority April 22nd; Lieut. G. M. Morrison, Can. Inf., seniority April 28th, June 9th.

Balloon Officers.—Temp. 2nd Lieut. (on prob.) W. T. Samuels, Gen. List, May 1st. Temp. 2nd Lieut. G. Lacey, Gen. List, from an Equipment Officer, 3rd Cl.; May 17th. Temp. 2nd Lieut. T. O. Davis, Gen. List; Temp. 2nd Lieut. (on prob.) W. A. Lane, Gen. List; Temp. 2nd Lieut. F. H. May, Gen. List; Temp. 2nd Lieut. C. W. T. Paull, Gen. List; May 30th.

Equipment Officers, 3rd Class.—2nd Lieut. W. G. Stafford; Oct. 12th, 1916. Temp. 2nd Lieut. (on prob.) H. W. Denton, Gen. List; May 3rd.

Memoranda.—To be Temp. 2nd Lieut. (on prob.) for duty with R.F.C. :—**H. G. Hearty, June 8th; C. A. Weston, H. G. Burroughs, G. J. Allday, J. A. Armstrong, H. R. Hardy, June 30th.**

Supplementary to Regular Corps.—2nd Lieut. (on prob.) W. Wells resigns his commission; July 1st.

London Gazette Supplement, July 2nd.

Flight-Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed: Lieut. A. E. McKay, S.R.; April 26th. 2nd Lieut. (Temp. Lieut.) J. O. Leach, M.C., Middx. R.; 2nd Lieut. A. P. M. Sanders, Northd. Fus.; June 4th. Temp. 2nd Lieut. I. V. Pyott, D.S.O., Gen. List; June 18th.

Flying Officers.—Temp. 2nd Lieut. H. M. Lewis, attd. Welsh R., and to be transfd. to Gen. List; May 7th. Lieut. H. A. Anson, S. Wales Bord. (T.F.), and to be secd.; May 23rd. Capt. S. R. Penrose-Welsted, R. Ir. R., from a Flying Officer (Ob.); May 24th, seniority Sept. 9th. Temp. 2nd Lieut. (on prob.) G. A. Lingham, Gen. List; June 8th.

Flying Officers (Observers).—2nd Lieut. C. Cotterill, Ches. R. (T.F.), and to be secd.; April 25th, seniority Dec. 15th. Lieut. F. E. Williams, Welsh R. (T.F.), and to be secd.; Mar. 28th, seniority Jan. 29th. 2nd Lieut. W. C. Cambray, Lond. R. (T.F.), and to be secd.; June 13th, seniority Mar. 26th. 2nd Lieut. K. W. MacKichan, R.A., and to be secd.; May 25th, seniority April 7th.

Equipment Officers, 2nd Class.—From the 3rd Cl., and to be Temp. Lieuts. whilst so employed: Temp. 2nd Lieut. A. Latimer, Gen. List; June 6th. 2nd Lieut. J. Goodenough, S.R.; June 14th.

3rd Class.—Temp. 2nd Lieut. (on prob.) R. B. Herring, Gen. List; Feb. 14th. Qr.-Mr. and Hon. Lieut. S. H. Cleall, R. Ir. Fus.; May 27th. Temp. 2nd Lieut. E. G. Clement, Gen. List; Temp. 2nd Lieut. E. D. Dawson, Gen. List; June 6th. Temp. 2nd Lieut. J. D. Fairbairn, Gen. List; Temp. 2nd Lieut. M. P. Graddon, Gen. List; 2nd Lieut. J. S. Reid, S.R.; June 10th. Lieut. A. N. Buchanan, S.R., reverts from the 2nd Cl.; June 14th, seniority May 29th, 1916.

Memoranda.—Actg. Sergt.-Major J. McDonald, from R.F.C., to be 2nd Lieut. for duty with R.F.C.; May 6th.

To be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: S. E. Buck; May 14th, seniority April 3rd. A. Ross; June 4th. A. Colledge; June 20th. F. W. Atkinson, T. S. Nash; June 30th.

2nd Cl. Air-Mechs., from R.F.C., to be Temp. 2nd Lieuts., for duty with the Mil. Wing of that Corps: E. G. Clement, E. D. Dawson; June 6th.

Supplementary to Regular Corps.—2nd Lieut. H. S. Lees-Smith (Capt., S. Afr. Def. Force) to be Lieut.; June 1st. Lieut. H. S. Lees-Smith to be Capt.; June 6th.

Special Reserve of Officers.—The following, from an Officer Cadet Unit, to be 2nd Lieut. (on prob.) (June 21st): J. U. G. Lamond.

Royal Flying Corps (Territorial Force).

London Gazette Supplement, July 2nd.

Lieut. P. Bishop to be Temp. Capt.; Mar. 26th.

2nd Lieuts. to be Temp. Lieuts.: T. H. L. Salisbury; Mar. 24th. S. Blackman, C. A. Hudson, S. B. Smith; Mar. 26th.

AVIATION IN PARLIAMENT.

Royal Naval Air Service.

MR. PEMBERTON BILLING, in the House of Commons on June 2nd, asked the First Lord of the Admiralty whether he will state if an enemy submarine was attacked by a Royal Naval Air Service seaplane on May 1st last in the North Sea; if the attack was successful, and who was the pilot responsible; if on June 14th Zeppelin L43 was attacked by an officer of the Royal Naval Air Service; and, if so, was the attack successful, and who was the officer responsible?

The Parliamentary Secretary to the Admiralty (Dr. Macnamara): We do not think it desirable to state where or how attacks are made on enemy submarines and Zeppelins. But, of course, in the case of such attacks, the names of the personnel engaged are duly reported to the Admiralty and appropriate reward is made.

Mr. Billing: Will the right hon. gentleman in future adopt the policy of either publishing all the names of these officers or none, and not making distinctions between some officers and others?

Dr. Macnamara: Perhaps the hon. member will give me a case.

Air Services in Mesopotamia.

MR. BILLING asked whether he has received any complaint, official or otherwise, regarding the type of machine supplied to the air pilots on service with the British troops in Mesopotamia?

The Parliamentary Secretary to the Air Board (Major Baird): I am not aware of the receipt of any communication on this matter which could with correctness be described as a complaint. The Commander-in-Chief in Mesopotamia has stated that he would like certain additions to the aeronautical equipment of his forces and his wishes in this respect are being met.

Mr. Billing: Is the hon. gentleman aware that the Germans have discovered our *ruse de guerre* and know that we are making it a dumping ground for the worst of our machines and they are making arrangements accordingly?

Reprisals.

MR. BILLING asked the Prime Minister whether he is prepared to give an early date for a debate on our Air Services, policies, and administrations, in order to enable the members of this House to express the views of their constituents on the question of reprisals?

The Chancellor of the Exchequer (Mr. Bonar Law): The answer is in the negative.

Mr. Billing: May I ask the right hon. gentleman whether the War Cabinet, the Government of this House of Commons, are responsible to the people for the policy and for the conduct of this war?

Mr. Bonar Law: The War Cabinet is responsible to this House, and between us we are responsible to the people.

Mr. Billing: Will the right hon. gentleman give this House an opportunity of expressing its views or at least the views of the country?

Mr. Bonar Law: I have answered questions of this kind, I think, about once a day for ten days, and I have stated more than once that if I find there is any general desire to discuss the subject an opportunity will be given.

Colonel C. Lowther: May I ask if the bombing of our cities and the murder of our women and children and other acts against civilised warfare are to go on for ever unpunished?

Mr. Bonar Law: No, not if we are able to stop them.

Mr. P. A. Harris: Is it not a fact that yesterday Lord Cowdray made a full and frank statement to many members of this House who required explanation and that he explained why that information had to be confidential?

Mr. Bonar Law: I am well aware of the meeting yesterday, and I think that it was very desirable.

Colonel C. Lowther asked the Prime Minister whether his refusal to entertain any organised system of reprisals is due to the fact of their impracticability or to the Government's antipathy to methods which they consider barbarous?

Mr. Bonar Law: I can only refer my hon. friend to the answer which I gave to him yesterday.

Colonel Lowther: In spite of the answer, will the Government consider one form of reprisals which admits of no delay, and that is the ignition of German forests? Has my right hon. friend's attention been called to an admirable pamphlet by Prof. Beale, in which he shows that a series of aeroplanes armed with special incendiary devices could very easily set on fire the Black Forest and other very valuable forest land?

Mr. Bonar Law: I need not tell my hon. and gallant friend that this is not the first time we have heard of that suggestion.

Pilots for the R.F.C.

MR. BILLING asked the Prime Minister whether, as a matter of policy, he will instruct naval and military authorities to release for service in the Royal Flying Corps or Royal Naval Air Service every man under 25 years of age who is peculiarly fitted for, and desirous of, becoming a pilot or, alternatively, if he will instruct the naval and military authorities to encourage suitable volunteers for the Air Service by at least registering their names?

Major Baird: I have been asked to answer this question. The provision of pilots in numbers sufficient for manning the increasing supply of aircraft is a question for the naval and military authorities, who are responsible for the recruitment and training of personnel. There is at present no difficulty in obtaining suitable volunteers for the Air Services and there is no lack of encouragement.

Mr. Billing: Are we to understand that we have all the pilots we require, and that there is no desire for adding to their numbers?

Major Baird: The hon. member had better understand exactly what the answer says.

Mr. Billing: May I ask this question of the Prime Minister? It is a question of policy and not a question of detail for little understrappers to answer.

Compensation for Air Raid Victims.

MR. BILLING asked the Prime Minister whether the Government are prepared to reconsider their decision with regard to the compensation of victims of air raids; if so, when it is proposed to make a definite statement in the House; and whether, under these circumstances, to prevent confusion and ensure equity, the Government will consider the advisability of abolishing the present system of Government insurance?

Mr. Bonar Law: With regard to the first two parts of the question, I can add nothing to the replies I gave on the 19th and 22nd inst. to the hon. member for East Edinburgh. The answer to the last part of the question is in the negative.

Air Raid Warnings.

MR. BILLING asked the Prime Minister whether the Government has yet decided to adopt a policy of air raid warning by day; if it is proposed to adopt a policy of air raid warning by night; and, if so, if a standardised system of warning will be instituted throughout the country, or whether each local authority will be permitted to make its own arrangements?

Sir G. Cave: The Field-Marshal Commanding-in-Chief established some time ago a system of night warnings which covers the whole country, and has worked well, and he has now established a system of day warnings in the area which is exposed to attack by hostile aeroplanes. In both cases the warnings are conveyed to the proper military and police authorities and to certain factories and institutions where special precautionary measures are required in the public interest; no public warning is given by the military authorities. In certain areas public warnings are prohibited by military order, and the Government has now decided that no public warning should be given in London, but elsewhere local authorities are allowed to give such warning if they think it desirable.

Mr. Billing: Is the right hon. gentleman prepared to receive a deputation from the City in this connection as to whether warning should or should not be given?

Sir G. Cave: I have already received a deputation, which included the Lord Mayor of the City of London.

American and British Aeroplanes.

MR. BILLING asked the Prime Minister whether we have yet dispatched to the United States Government aeroplanes of our latest design for their guidance and information; and, if so, when these were dispatched or, if it is not proposed to assist the American Government in this matter, will he state the reason why?

Major Baird: I have nothing to add to the answer which I gave to the hon. member on this matter on May 24th.

Mr. Billing: This question is addressed to the Prime Minister, and I must ask the Prime Minister to reply. [*Interruption.*] On a point of Order. This question is purely on a point of policy—whether or not we should aid our American Allies in the construction of aeroplanes—and it is not for an Under-Secretary to answer at all.

Sir S. Roberts: On a point of Order. I should like to ask your ruling whether Ministers are obliged to answer members who use offensive expressions towards them?

Mr. Speaker: It is not the way, of course, to get an answer.

The Supply of Aeroplanes.

SPEAKING on the Estimates for the Ministry of Munitions in the House of Commons on June 28th, Dr. Addison, the Minister of Munitions, said: The requirements for locomotives, Tanks and transports were great, but in January we had to undertake the supply, for the Army and Navy, of aeroplanes and seaplanes. It evidently was desirable that we should have under our control all varieties of supplies to meet the demand upon internal combustion engines. I therefore asked our Advisory Committee to recommend a scheme which would bring the production of all internal combustion engines in the country under a unified system of production and control. As in the case of the agricultural implements, we obtained for the asking the services of Mr. Martin, of the B.S.A. Co. and of the Daimler Motor Co., to control production.

We found when we surveyed it that often there were five or six different types of engines being made in one shop. There was a great diversity of type, so that we concentrated upon simplified production as far as possible. Only one type of engine was to be made in one shop. We also arranged for as few as possible types of manufacture—and, of course, those of the best. The functions of this Internal Combustion Engine Control Department is not executive. It is simply to give orders to all the Departments of the Ministry requiring these engines as to where they are to get them. It is responsible for the proper sorting out of the productive capacity of the country for this kind of machine. Sir William Weir, who, as Director of Munitions, has worked for us since the beginning of the Ministry in Scotland, undertook the supply of aeroplanes. Mr. Martin and Sir William became members of the Air Board

and of its technical committee, and in that way we established a close working relation between the manufacturing side and the Departments which formulate programmes and designs. I am glad to say that the output of aeroplanes is rapidly increasing. In May it was more than twice as great as it was in December. We shall make very rapid progress, and are making very rapid progress, in this matter. The supply by Christmas will be vastly greater than it is now. I am sure that the House will appreciate the fact that this department of work makes a particular demand on skilled workers, for our increased production of aeroplanes depends largely upon an adequate supply of skilled workmen.

Government Grants to Air Raid Victims on June 28th.

MR. HOGGE, on June 28th, asked the Prime Minister whether the Government have considered any scheme for dealing with those who have been disabled as a result of injuries arising out of air raids and the dependants who have been left helpless as a result of the death of the breadwinner; and when a statement of policy may be expected?

Mr. Bonar Law: I have made careful inquiry into this question, and find that in connection with air raids temporary assistance of a generous kind is forthcoming from the National Relief Fund and certain local funds, including the Mansion House Fund in the case of the recent raid on London. By this means it is possible to grant temporary maintenance allowances, to replace essential articles of furniture, to defray funeral expenses, and to secure the provision of medical or surgical treatment or appliances.

The Government has also decided to make *ex gratia* awards from public funds of a more permanent character in cases where personal injury has resulted in death or permanent disablement, and where the injured person or his dependants, as the case may be, are otherwise unprovided for. Claims for such assistance will be investigated by the local representative committees set up at the beginning of the war under the Government Committee for the Prevention and Relief of Distress. The reports of the committees will be forwarded to the Treasury, who will make the awards according to the circumstances of the various cases, and follow generally the principles of the Workmen's Compensation Acts.

Mr. Herbert Samuel: Is that decision retrospective? Does it apply to injuries suffered since the beginning of the war.

Mr. Bonar Law: I have considered that, and I think it is only right that the terms of my answer should apply to such cases.

Mr. Joynson-Hicks: Will that also relate to injuries to property? The south-east has suffered heavily.

Mr. Bonar Law: No. I cannot say anything in regard to property.

Mr. Rea: Does this apply only to air raids or will it apply also to bombardments?

Mr. Bonar Law: This answer applies only to air raids. I believe something special was done in regard to bombardments, apart from what has been done in regard to air raids.

Acquisition of Land for Landing Ground.

MR. JOYNSON-HICKS, on July 2nd, asked whether, in August, 1916, the Northern Command gave notice to the owners of certain land at Lullington, in Leicestershire, that they proposed to take it as a night landing-ground; whether orders were given to cut down trees, grub up hedges, fill up drinking ponds, and level the land at a cost altogether of some £2,000; whether, six months afterwards, the scheme was abandoned; whether, about the same time, similar proceedings took place in regard to some land at Popplewick, near Nottingham, except that here hangars and other buildings were put up, and that these were subsequently also abandoned; what was the sum wasted by the nation over these proceedings; and whether anybody has been punished in connection with them?

Mr. Macpherson: The ground in both these places was taken for purposes of defence. Owing to developments and alterations in the general scheme of aerial defence the immediate purpose for which the ground was taken ceased to operate. The ground, however, amply fulfilled its object as long as the situation demanded it, and in neither case therefore was the expenditure wasted. The preparation of ground to admit of safe landing by night is inevitably an expensive matter. The ground at Popplewick will almost certainly be required again, and the sheds erected will be utilised either there or elsewhere.

Mr. Joynson-Hicks: What were the objects which the ground was intended to fulfil? Was it ever used at all?

Mr. Macpherson: I must ask my hon. friend to give notice of that.

Mr. L. Jones: Is it not the case that the land at Popplewick was found, after the expenditure had been incurred, to be wholly unsuitable?

Mr. Macpherson: I do not think that that is the case.

Mr. Joynson-Hicks: Will the hon. gentleman make inquiries?

Mr. Macpherson: I must have notice of that, but I will make inquiry.

R.N.A.S. Work.

THE Secretary to the Admiralty issued the following on June 26th:—

"In the course of a patrol on the 25th inst. three machines of the R.N.A.S. encountered and engaged ten enemy machines in the vicinity of Roulers. After 15 minutes' fight one enemy machine was seen to go down in flames. It is thought that two more were driven down out of control, but owing to clouds this could not be verified. Our three machines finished their patrol and returned safely."

Air Work on Indian Frontier.

IN a *communiqué* issued by the Secretary of State for India on July 1st regarding operations in Waziristan, it is stated:—

"Our aeroplanes raided Makin and Marobi with considerable effect."

Mr. Orville Wright's Views.

IN an interview with the *New York Times* Mr. Orville Wright is credited with the statement that 10,000 aeroplanes would end the war within ten weeks. Literally to sweep from the heavens every German aeroplane would be to put out the eyes of the German gunners.

"The United States should begin the construction of a vast fleet of little fighting machines carrying one man and a quick-firing gun, and send them to the front within the year."

Lord Northcliffe on America's Aid.

SPEAKING at a luncheon given in his honour in New York on June 28th, Lord Northcliffe said that it was only by the absolute mobilisation of man power and machine power that the war could be won. In Europe, for example, one of the largest corset factories was now turning out very delicate pieces of machinery needed in the construction of aeroplanes. The automobile factories will inevitably be commandeered for the manufacture of aerolpane parts and aeroplane construction generally. In the aeroplane lies the one great hope of an Allied victory. The war has taught that the aeroplane engine of the spring may be almost useless for actual fighting next autumn, so rapidly are developments produced by the fierce competition of war.

U.S. Aviators Arrive.

A CONTINGENT, numbering 100, of mechanics of the U.S. Flying Corps, in charge of Major Bolling, arrived on this side on June 25th. They were in plain clothes, but wore a blue silk armlet inscribed "U.S. Flying Corps." According to the *Daily News* correspondent in Washington, it is planned to send, starting on August 25th, 200 aviators a week for the Army and to fit 25,000 youths for the flying services in a year.

Brave Firemen in Air Raid.

THE following members of the London Fire Brigade are commended for rescuing 14 persons from a position of peril, following on the dropping of a bomb from enemy aircraft on June 13th: Fireman F. Braxton, G. B. Gardiner, J. R. Davies, A. J. Trimmer and P. A. Greenaway. The following four men are commended for saving four lives from a building damaged by explosion and fire caused by bombs on the same date: Firemen J. W. Spurgeon, W. Gowler, D. W. Tebbey and W. T. Cooper.

Is Remorse Getting Home?

A SEMI-OFFICIAL telegram sent out from Berlin on June 28th said: "The grief in Germany is not less than the grief in Great Britain that in the last air attack for military objects on London, civilians, especially children, fell victims. It has occurred to nobody in Germany to regard the death of these children as a justifiable reprisal for the hundreds of children who fell victims in the air raids on Karlsruhe, Freiburg and Trier (Treves)."

Air Work Over Lens and Avion.

WRITING to the *Daily Telegraph* with regard to the attack by the Canadians on Avion, Mr. Philip Gibbs said:—

"In the still air there was the drone of many engines. The darkening sky was full of black specks, which were British aeroplanes flying out on reconnaissance over Lens and Avion. 'Brave birds,' said a friend by my side, waving up to them. German shrapnel puffed about their wings, bursting with little glints of flame, but they flew on. A German sausage balloon staring over our battlefield took fright and waddled down to earth. A German aeroplane snapped out a few shots from a machine gun and fled to a safer corner of the sky, which grew darker as the quarters passed, with a greenish colour on the edges of low clouds.

"At half-past six or so our air squadrons came back, and then went home. 'No battle after all,' said a man on earth. 'Those fellows have finished for the day.' But one fellow stayed. We had been watching him for some time, and he had shown signs of friendliness to us, skimming several times over our shell-hole within shooting distance. He was a most astonishing young gentleman, up to all manner of tricks, as it seemed out of sheer good humour, and time and time again he went darting over Avion, and then came back and dropped behind our lines like a tumbler pigeon, rolling over and over down the spiral staircase of the sky, or falling in a frightful nose dive, which looked like certain death, until he flattened out and flew, just to shave his wings over the shell-craters. He went down the Vimy Ridge like a boy on a toboggan, and came up again like a strong swimmer on a rolling wave. The last time he swooped right down over our shell-hole with a wave of the hand, which said as clear as possible, 'Cherry oh.'"

Another Italian Mail Service.

IT was announced on June 28th that another Italian overseas mail service was inaugurated on that day. An aeroplane with mails left Naples at 6.24 and arrived at Palermo at 9.25. It was to make the return journey in the evening.

FLIGHT

THE TRAINING OF AERONAUTICAL ENGINEERS.*

By R. MULLINEUX WALMSLEY, D.Sc., F.R.S.E., and C. E. LARARD, M.I.C.E., M.I.M.E.

IN many quarters it is invariably the custom to overlook the fact that education is the most technical of all subjects, and requires as careful and laborious a study as any of those subjects which have preceded it in this course. That this is not generally recognised would be borne in upon anyone who would have the patience to read the proceedings and discussions of the numerous educational conferences which have been such a marked feature of the past winter. Education is "in the air," and has given rise to an almost endless succession of papers and speeches with little variation in the subject matter; the same things have been repeated *ad nauseam*, sometimes with very little difference in phraseology, while the number of really new ideas produced has been remarkably few. It is hoped, however, that as the authors are dealing with education for a new profession which itself is in a state of flux, they may, in what follows, contribute something of value to the general discussion. The following is, at any rate, a genuine attempt to place aeronautics on its educational side on a sound basis, so that, on this side, it may rank with the older well-established branches of engineering.

It is assumed that it is unnecessary to discuss the question as to the necessity for well-thought-out and co-ordinated schemes for the technical education of those who are to take charge in the near future of this important and scientific industry, that is, if this country is "to take the air and keep it," as has been recently well said by a well-known authority. If anything could have emphasised the point it would have been the far-reaching plans unfolded in the interesting paper of Mr. Holt Thomas and the discussion thereon barely a month ago in this series of lectures. Those plans take it for granted that a highly-trained staff of constructors and workmen will be available possessing a flexibility of mind based upon sound and varied knowledge which can only be acquired by such training as that which is dealt with in the present paper. The backbone of such a staff is an ample supply of aeronautical engineers who usually commence their professional work as technical assistants and who by habit and training are acquainted with the latest developments of the practical, scientific and industrial problems which they are called upon to face. The greater part of the paper is therefore devoted to a discussion of the methods, as they appear to the authors, of training those who are in a position to devote not less than four years to a training designed to fit them at the end of the training to commence practice as junior or senior technical assistants with every prospect of rising rapidly to higher, responsible positions. The needs of other classes less favourably placed and of those who are to fill lower positions are not lost sight of, and especially of that class of men already in the industry who must be given opportunities for keeping abreast of aeronautical developments as they proceed and of making up from time to time the ground which the strenuous nature and pre-occupation of their daily work must cause them to lose.

The main object of the paper is the professional training of aeronautical engineers, but before this can be adequately dealt with it is necessary to consider the educational foundation upon which, in the opinion of the authors, this training should be based, for one outcome of the past winter's discussions has been to bring into prominence the chaotic nature of much of the general education of the youth of this country.

Preliminary Education.

The preliminary education of students who desire to be trained as aeronautical engineers should, in the opinion of the authors, be a good secondary school education, in which the student has been taught, through the medium of the proper subjects of such an education, to think and weigh evidence. If this end be attained, it is far more important than any workshop or other quasi-technical training that can be obtained in a secondary school, especially if, as is often the case, such training is given at the cost of the more essential subjects of a secondary school education. The claims of science and scientific method to be included in such a curriculum have now been practically conceded, even by many who have been for long years staunch upholders of the claims of the "humanities," to dominate the time-table to the exclusion of nearly everything else but mathematics. A good grounding in mathematics is, of course, of prime importance to the future engineer, and his curriculum must also include a good working knowledge of not less than one modern language, in view of the large amount of scientific and technical literature published in foreign journals and by foreign societies, as well as of the fact that during the next fifty years an enormous amount of engineering work will be required in countries in which English is not the vernacular, and that engineering industrial developments will be the common heritage for all time of all the civilised countries of the world.

For many years science was practically tabooed in the secondary schools on the plea that there was no room for it in a time-table in which even modern languages had not a very conspicuous share. What was still worse was that the best and brightest boys, or at any rate those developing the greatest promise, were never given a chance of showing their aptitude for a scientific training, but at an early period of their school career were set to specialised studies in the humanities, including an excessive amount of time devoted to Latin and Greek, so that in due course a small minority of them might bring renown and distinction to the school by winning university scholarships. Meanwhile, as a sop to public opinion, a "modern" side was formed, to which only the conspicuous failures were drafted.

These evil methods still persist in certain schools, but other dangers have more recently begun to show themselves in quite another direction. There is now a danger that science may not be adequatefy dealt with because of the desire to include "engineering" subjects in the time-table. The prospective engineer should first be well educated, in the proper sense of the word, in mathematics, in the humanities (but including English and modern languages), and in science, his education in science being with a view to training in scientific method rather than to the handling of a large number of subjects. An education which adequately covers this range will certainly fill the limited time of the average boy and will satisfy the ambition of the most voracious schoolboy. The intensive study of the sciences on which all engineering is based as well as the special "engineering" subjects which, of late years, are becoming fashionable in certain schools, will be far more advantageously and economically postponed until the time when real professional training is undertaken.

If the student has received a good education, in the sense set forth, he should be ready to start his engineering training by the time he reaches the age of 17 in the case of the best students, and at 18 in the case of students whose development is not so well forward. From the engineering point of view, the retention of a youth at a secondary school beyond these ages for the purposes of taking so-called "engineering subjects" constitutes a very serious loss of time, in view of the fact that such subjects cannot be properly and economically taught, except in correlation with a systematic and well-organised complete engineering course, and further, such work cannot in general be effective when undertaken by any but a fully qualified engineering teacher. It is obvious that when subsequently attending a complete engineering course at a technical college the student will receive in fuller and sounder measure such instruction as part of the regular course covering all, and more than all, he could have possibly received in a secondary school; and, moreover, there is a real danger, which has been actually experienced, that certain methods and ideas included in certain school courses may have to be corrected, if not eradicated.

Technical Training.

Passing now from the preliminary but important school work to the subsequent professional training, there is much division of opinion among engineers and engineering teachers as to the position which workshop training should occupy in relation to the more purely technical training of the student. Many engineers and engineering teachers are of opinion that practical experience on the works or in the factory of an engineer should be gained *before* taking up an engineering course at a technical college. They argue:—

1. That works experience is necessary to enable the student to take full advantage and realise the importance of his studies at an engineering college.

2. That it does not follow that a man who has first passed through the technical college will necessarily make a successful engineer, the works training under practical conditions being, it is asserted, the best test for his fitness.

3. That the student trained in the technical college does not, after his college course, take kindly to the manual labour in the shops necessary to complete his experience, and that when he passes into the works as a workman he finds a greater difficulty in raising himself afterwards to a position of responsibility than one who has obtained works experience first and technical training afterwards.

* A Paper read before the Aeronautical Society on June 27th.

There are, however, other well-known engineers (and engineering teachers) who are of opinion that the above views are too often based on an imperfect knowledge of what a really good college course in a modern and up-to-date technical college can accomplish, especially if it be combined with practical experience in works judiciously introduced at the proper period when the early stages of engineering training have been sufficiently developed to prepare the student to assimilate the experience of a commercial workshop more rapidly. Such systems of engineering education are now known as "Sandwich" systems, and as long ago as 1903 a pioneer system of this type was adopted at the Northampton Polytechnic Institute, after a careful and exhaustive enquiry into the details and the results of the various systems of engineering education then in being in the chief countries turning out good engineering work. In organising, planning, and carrying out the necessary instruction courses, the Principal, who introduced the system, has received the loyal co-operation of his colleagues on the staff; and it is to this co-operation that the success attained is due, and what immediately follows is based upon the experience so gained, and not upon mere educational theory.

It is therefore submitted that engineering training in a well-staffed and well equipped technical college should be started directly the student leaves the secondary school, and that for this purpose, as college sessions begin at the end of September, he should leave school not at Christmas or Easter, but only at the end of the summer term in July. As already mentioned, it is considered in some quarters desirable that a student, on leaving the secondary school, should go straight into a works for, say, a year, in order that it may be ascertained whether he has any aptitude for engineering training. There is, however, a good deal of evidence to support the opinion that aptitude for engineering training can be more readily and quickly tested in a well-organised technical college, staffed with men who have been through the works, than it can in the works. The question is, to some extent, one of "lost time." In the works weeks, if not months, must inevitably be lost before the student begins to understand in any educational sense what is going on around him. On the other hand, if he goes straight to the technical college his education is continued without a break being very apparent. In fact, one of the difficulties in a modern technical college is to make the first-year student realise that he is no longer at school, and that his professional work has commenced, and further that the greater freedom of college conditions which he is quick to take advantage of is accompanied by a correspondingly greater amount of individual responsibility.

For admission to the college the student should be required to pass an entrance examination if he has not, as he should have done, passed an examination qualifying for admission to a University before leaving the secondary school. But such an entrance examination and even the University matriculation should be regarded as merely indicative, and not as the actual test of the candidate's aptitude for an engineering career. The real extrance examination in a technical college is the work of the first term, or of the first session, and during one or other of these periods the trained staff is capable of answering very definitely the question "Should the engineering training be continued?" If the answer be in the negative, the training should be dropped not later than the end of the first year, and the student should devote his energies to some other training more in accordance with his natural bent. If, however, it is decided that failure in the first year is due merely to a student, as is sometimes the case, failing to realise his responsibilities and opportunities, he should be given another opportunity of facing the first year's work.

As to the kind of training specially suitable for aeronautical engineers, the authors make no apology for basing the schemes which they put forward upon the experience of the teaching of aeronautics gained at the Northampton Polytechnic Institute, at which pioneer courses were started in September, 1909. This experience is combined with their experience in the successful training of engineers in other branches of engineering which has been referred to above. Detailed syllabuses and time-tables are set forth in Appendices I and II, and in the following remarks reference is made to these.

No distinction is made in what follows between the professional training of engineers in the Universities and in technical institutes. In both cases the training is essentially the same for all students who are commencing their training and for all students up to the standard of a first, including an honours, degree at the University. As a matter of fact, throughout the country the association of the larger technical institutes with the Universities is very close indeed. In London the principal teachers of engineering, in the more important of the polytechnics which prominently deal with engineering, are members of the Boards of Studies in Engineering at the University, and these institutions are recognised under the University Statutes for training internal students. In Manchester the association is even closer, the Municipal School of Technology being a part of the University for all effective purposes. Similar associations exist elsewhere, but in accordance with our time-honoured English plan of doing these things, they differ in detail in almost every instance.

The chief function of a technical college in this connection is obviously to train real engineers and not merely to train University graduates, but if the University curriculum is properly drafted, the two curricula cannot differ very much up to the honours standard of a first degree. Where the University work in the future should be most differentiated from that of the technical colleges should be in the greater leisure and opportunities for post-graduate research, though, as is well known, such research is by no means neglected at the foremost technical colleges, and the point is dealt with later. In this connection a cordial vote of welcome may be given to the munificence of M. Zahkaroff on his gift, through the British Government, of £25,000 to the University of London for the foundation of a chair in aeronautics.

For the purposes of this paper it will be convenient in taking up the details to separate that part of the college training which is not specially aeronautical, but is common to other branches of engineering, from the part which is more particularly required by aeronautical engineers, and which would not, as a rule, be taken by other engineering students.

The Necessary College Training not Specially Aeronautical.

It is not clearly understood by some aeronautical engineers and by many others that a sound preliminary training in general engineering principles similar to that outlined in the Northampton Institute syllabuses for first and second year day students is required before any reasonable progress can be made with the higher studies in aeronautics, or even of any studies in aeronautics distinctively so called; and further, that concurrently with the specialised instruction in aeronautical engineering following such a preliminary training much higher instruction work in mechanical engineering is required. For instance, it is essential that the student's mathematical studies shall continue through each year while attending the technical college, the standard of knowledge attained being the same as for other departments of engineering, and including a good working knowledge of the differential and integral calculus and of higher mathematics generally.

The course outlined is intended to cover four ordinary educational sessions from the beginning of October in the first year to July in the fouth year. In this period the second and third summers, from April to October, are to be spent in commercial workshops, with only such works holidays as fall within those months.

The first session's work is based upon the assumption that the prospective student has attained the well-known standard set for the matriculation at the University of London, either in a general examination or through the senior school examination. This ensures a fair knowledge of elementary mathematics, the power of expression in English, a knowledge of one language, and some knowledge of a science from which it is hoped that the student has acquired some idea of scientific methods. So as not to exclude latent engineering talent, however, some students are admitted on a designedly lower entrance standard in view of the rigorous application of the plan set forth above of treating the whole of the first year's work as an extended entrance examination.

The first session's work is devoted to a thorough grounding in mathematics, pure and applied, physics and chemistry, with the addition of engineering drawing and elementary engineering design, such as is required by all engineers, civil or mechanical. It is during this period that the ineligibles and the slackers are weeded out, rather than at the entrance examination, at which some of the students on the border line for passing can therefore be admitted as probationers, to give them a chance of showing whether they are likely to be successful in the later courses.

Special technological training begins with the second session, which, as already explained, is a two-term session, at the end of which works experience, lasting from Easter to October, is to be started. Distinct specialisation begins from the time the student goes into the works at Easter of this second session, and from that time onward the aim is to train him very specially in some main branch of engineering, in this case in aeronautics, whilst giving him a good knowledge in other branches. It must be understood that in these later years, notwithstanding early promise, a particular student may show

that he is unable to assimilate the highest training offered. In such a case it will be advantageous to transfer the student to the works when he has reached the limit of the college training he is capable of absorbing, and which will undoubtedly be a great advantage to him in his subsequent work.

Time-tables for these two sessions of general training are given in Appendix II., but as detailed syllabuses are not given in Appendix I. a few remarks may be made upon the scope of the work in the various subjects at this stage.

In mathematics the aim throughout is to train and develop the student's mathematical faculty (which if poor or entirely lacking will disqualify him from dealing with advanced problems in engineering) in such a way that ordinary mathematical processes in algebra, geometry, trigonometry, and the differential and integral calculus become *working tools*, to be almost unconsciously used as a matter of habit.

The physics in the preliminary course is treated with the distinct purpose of qualifying the student specialising in aeronautics later on to deal readily *inter alia* with the theory and practical calculations of aero-engine cycles, to grip the principles and details of magneto ignition and other electrical devices carried by aircraft, and to understand their observational equipment, &c., &c.

The special study of aero engines must obviously be preceded by an outline study of heat engines generally and of heat engine cycles, particularly those dealing with internal combustion engines. The fundamental principles of hydraulics and pneumatics, as well as of meteorology, call for special study during the preliminary work at a properly-organised course of instruction in aeronautics.

During this preliminary course the student also acquires a knowledge of the principles of chemistry sufficient, at least, to enable him to deal effectively, when taking the higher and more specialised work of the advanced course, with the necessary calculations on the combustion of fuel, and particularly of gaseous fuels. His laboratory training includes the use of gas analysis apparatus and the analyses of exhaust gases from internal combustion engines.

His preliminary studies of engineering materials, from the chemical as well as the mechanical point of view, are designed to enable him to understand the importance of a chemical analysis of the material and of the influence, beneficial or deleterious, of small percentages of certain chemical elements on the properties of the material for resisting static or kinetic stress and on the elasticity and resilience of the material.

Aeronautical drawing and design obviously cannot be properly dealt with until the student has first mastered the elements of geometrical and mechanical drawing and made himself familiar with drawing office methods. This preliminary training, therefore, is dealt with before attempting any specialisation in aeronautics. In the courses and time-tables given in Appendix II. provision is made during the first session for giving a thorough grounding in these essentials, and it is unnecessary in a paper of this kind to give a syllabus of the kind of preliminary work in this connection. It is too well known to require specification.

And last, but not by any means of least importance, some attention must be given to the business or commercial side of engineering. How often has it been said by the employer, "Yes, So-and-so is excellently trained in engineering theory and is even fairly good as a designer, but in business matters he is a baby, and not to be compared with men in my works who, though they may not be good at theory, know and can deal with the bearing of their work in relation to £ s. d. It is a pity that the technical schools cannot give some attention to their work in its business aspect." Even in the preliminary work, therefore, this aspect must not be overlooked, though its formal treatment belongs more properly to the specialised work of the third and fourth sessions.

The College Training Specially Aeronautical.

This special training, as already explained, is dealt with in the third and fourth session's work for which the time-tables will be found in Appendix II. For the special subjects appearing in these time-tables detailed syllabuses will be found in Appendix I, but in view of the relevancy of these subjects a few general remarks will not be inappropriate here.

The *theory of machines and of mechanism*, to lead up to which a good knowledge of mechanics is provided in the first two years, form a special feature of the advanced work in direct relationship to many practical problems, such, for example, as the inertia effects of moving masses, whether free or constrained, as in the primary and secondary balancing of engine parts. In this connection the gyroscopic effects on the machine, due to rotation or turning, in the engines, mechanism or propeller, and also the machine itself, are fully dealt with.

The *advanced design work* for aircraft prime movers necessarily involves the advanced theory of heat engines, modified by practical considerations and experience, together with mechanical design based on a full knowledge of the strength, elasticity, fatigue and durability of materials.

More advanced work than can well be included in preliminary courses is therefore given on the strength, elasticity and fatigue of materials, and proceeds concurrently with specialised instruction work in other subjects of aeronautical engineering. The effects of fatigue on the various parts of an aeroplane structure due to repetitions and variations of stresses does not yet appear to have attracted serious attention in connection with aeroplane work, and no doubt some disastrous failures of machines are due to such effects.

The *advanced drawing office work* in aeronautics consists in applying the general principles and experimental data for aircraft to the design of the details, the chief parts of the machine, and, finally, the full structure, with provision for more advanced design for students who wish to specialise in some particular section of the work, *e.g.*, engines, or propellers, or *fuselage*.

Very little has as yet been properly standardised for the constructive details, or even for the full machine, and each manufacturing firm is, to some extent, a law unto itself. This is, of course, inevitable from the nature of the case. Only a very limited amount of standardisation would at the present time be of any value, for the design work for aeroplanes is in such a state of flux that parts have to be designed and redesigned over and over again before anything final for a particular machine can be arrived at. After each design it becomes necessary in many cases to subject the built-up product to experiment or test in the laboratory and workshop, with the result that more often than not re-design is necessary. For example, unexpected weaknesses may be revealed under test in some part of a joint or clip, so serious as to render the greater part of the design useless until the defect is remedied by a modification of the whole design.

This being the present state of things in relation to aeronautical design, it follows that at the technical college testing in many cases should follow preliminary designs so as to arrive at a design distinctly good for the purpose it is intended to serve.

Too much must not be expected from the trained product of a technical college in this respect. As remarked more than once, the profession of aeronautics is a new one, and at present subject to ever-varying change. A vast amount of experimental work has yet to be done, new ideas which are at present only dimly emerging have yet to be tried, and new materials and combinations of materials have yet to be put to the test of actual utilisation. The manufacturer must be satisfied if the technical college gives him a trained intelligence under the guidance of a sound common sense—in short—a man who is well versed in the fundamental principles of aeronautics and who can apply his knowledge to a reasonable extent in both experiment and design.

Laboratory work, especially of such a highly technical type as is necessary in the education of aeronautical engineers, does ont lend itself in the same way as lecture work to the precise synoptical specification of a formal syllabus, and therefore no laboratory syllabus is set out in Appendix I. The scope and range of the work recommended will be better gathered from the following remarks.

In attempting, however, to give even an outline of some of the essential experimental or laboratory work one is brought face to face with the kind of difficulty necessarily experienced in dealing with a new industry or applied science, and in endeavouring to organise the educational work relating thereto, so as to give both the systematic instruction in the fundamental principles underlying that industry and to stimulate ideas for future developments.

Seldom in any branch of engineering has a new profession been created in so short a time, and never under such dramatic circumstances. Aeronautical engineering as a profession has been brought into prominence and practically created by the great issues at stake in the disastrous conflict still raging. Before the war aeronautics was little more than a sport or pastime, it has now definitely taken its place and will in future rank as a great profession.

The laboratory work specially aeronautical in character should consist of the testing of :—

(*a*) Special materials used in aeronautical construction for strength, elasticity, hardness and fatigue.

(*b*) Fastenings, attachments, shock absorbers and combinations of parts.

(*c*) Models of different forms in a current of air at different velocities.

(*d*) Propeller models in translational as well as for rotary motion.

(*e*) Aero engines.

Much of the laboratory instruction undertaken at the technical college will thus necessarily be of the nature of research, although a good grounding will have to be given in the more usual work dealing with the testing of the strength and properties of material and with the testing of engines generally.

In the testing of materials now commonly used in aeroplane construction, new materials will from time to time have to be tried. In addition to the testing of cables, strainers, and struts and ties, experiments will have to be made on simple and complicated steel and other plate and bolt attachments for building up the light skeleton aeroplane *fuselage* of wood and metal. The materials-testing laboratory for aeronautical engineering students will thus become, at any rate for some years, primarily a research laboratory.

Taking timber, for example, as used in aeroplane building. it might be thought that sufficient experimental data had been accumulated regarding spruce and other woods. But this is not the case, though probably there is much more data available than has been published. Much of the requisite experimental work remains yet to be done in the determination, *inter alia*, of the effect, on the strength and elasticity of the material, of defects inherent in the natural growth of the timber.

It has been shown, for instance, that the useful strength of timber is due to that part of its morphological structure known as "mechanical tissue," and experiments have been made which seem to point to the conclusion that this tissue is actually stronger than steel, but, of course, it is diffused or spread out by other vegetable or cell structures of negligible strength. Here alone is a vast field for research. Can this mechanical tissue be concentrated into close bundles giving relatively enormous strength, and if so, will the density of the material be then so high as to prohibit its use? Obviously the density, or mass per unit volume, is a factor which cannot be neglected in aeroplane work. Some woods are too heavy to be used at present. One of the author's assistants in a research carried out in the Materials Laboratory at the Northampton Polytechnic Institute, showed, for example, that the compressive strength of different kinds of timber was a linear function of the density—a very important result. Other properties, such as tenacity, deflection, and, in the case of struts, buckling, may also be a function of or dependent on the density. Then investigations are required on the strength and elasticity of timber, for the effects of knots and gum veins, the straightness or otherwise of the grain, the closeness of the mechanical tissues, the direction of the grain with respect to the plane of flexure. The effects of water absorbed during variable conditions of climate, *e.g.*, snow, rain or clouds, and the hygrometric state of the air on the material of the timber, have yet to be investigated.

There is further the necessity of testing plate and other attachments, by means of which the timber parts are secured together to form the skeleton structure of the *fuselage*, and in this connection those who have had to deal with the design and testing of these plate attachments for wood members know how very difficult it is to secure so firm a holding on such a light wood as spruce as to stand a reasonable working stress. Here again is a valuable field for laboratory work.

Turning to another matter, a very prominent part of the laboratory equipment must consist of a wind tunnel, with its motor-driven propeller and provided with indicating and recording instruments for experiments and research on models of planes and wing surfaces or structures, on models or parts of aeroplane structures, &c. Part of the wind tunnel should be arranged so that the air or stream line flowing past a plane model or solid obstacle can be made visible and the resistance measured. That is, the experimental work should be qualitative as well as quantitative in the determination of lift and drift for surfaces of varying forms and aspect ratios, and the resistance of models of aeroplane parts which are required to cut through the air. Indications of best sections and forms can in this way be obtained and provisional designs satisfactorily adjusted.

Workshop and practical work.—In the general scheme the bulk of the workshop and practical work is to be taken in actual and not in the college workshops during the two summer periods, and if in particular cases additional work of this kind is deemed to be necessary, it would naturally fall to be taken at the end of the fourth session.

In aeronautical engineering there is one kind of practical work, namely, aviation or flying, which cannot under present conditions be included in the course at a technical college, but in regard to which the student should acquire some definite knowledge. While, therefore, the educational course cannot deal with flying *qua* flying, yet it will be of advantage to arrange for periodical visits of the students to the flying grounds and even to provide for some lectures given by an engineer-aviator on the behaviour of aeroplanes under practical conditions of flight. In addition, as in other branches of engineering education, visits should be paid to works in which aeroplanes are in various stages of construction.. In this way the student will be stimulated in his studies and will gain some insight into the every-day work of the aeronautical engineer.

It may even be found to be possible in the case of the senior students to arrange for trial flights so as to familiarise them still further with the behaviour of the machines upon the theory and designing of which so much of their time will have been spent.

The case is analogous to that of the student apprentices of locomotive engineering or of marine engineering, who are always ambitious to take part in a trial run or a trial trip. Similarly, it is natural to suppose that a trial flight (not as pilot) will have attractions as well as being practically valuable for the student apprentice who is approaching the end of his college training in aeronautics.

Perhaps even the day is not far distant when the requirements of education and research will justify an experimental aerodrome, laboratory and flying ground for experiments on a larger scale and of much wider applications than is possible at the present time. The chief obstacle at the present time is the necessarily heavy expenditure.

Special and Evening Instruction.

No scheme for the education of aeronautical engineers can be considered complete at the present time which fails to take into account the general as well as the specialised instruction required by the very large number of engineers and engineering students who for various reasons are quite unable to attend aeronautical courses in an engineering day college.

These men may for the most part be placed in one or other of the following classes or categories :—

1. The rank and file of apprentices, learners, improvers and journeymen, the best of whom may subsequently rise to class 2, and who are employed or employable in the shops and drawing-offices.

2. Trained engineers, civil, mechanical, electrical, or military, who have already received in varying degrees of proficiency the educational training qualifying them for the particular branch of engineering in which they are or have been employed and who from the force of circumstances have changed over or intend changing over to aeronautical engineering. From the necessities of the case it goes without saying that, up to the present, the best design and constructive work in aeronautics has been done by men who received their technical education in one or other of the older branches of engineering before aeronautical work developed and this training has proved invaluable to them as a solid foundation for the specialised work of aeronautics. For some time to come the ranks of the aeronautical engineer will still be recruited from men already possessing these solid qualifications, the more ambitious of whom will be eager to supplement their training and experience by special study of the new science.

For the first-named or apprentice category an excellent start, well calculated to arouse the interest and stimulate the ambition of many who are only too much inclined to waste their leisure time, has been made in the series of works lectures which have been inaugurated by the society during the present session, and which it is proposed to extend in the coming autumn and winter. Further reference is made to this work later.

It is not likely, however, to be overlooked that if substantial educational benefit is to follow from these lectures, regular and systematic courses must be attended in a well-organised technical college. Such students will have to face much preliminary work in mathematics and general engineering theory, in drawing office and laboratory work before any real progress can be made by attendance at classes dealing specially with aeronautical engineering. Indeed, it will be found in this connection as with other branches of engineering that a very large number, probably the majority, will never effectively get beyond the mere elements of workshop calculations and drawing. Many are called but few chosen. Aeronautical engineering, like other professions, requires its "hewers of wood and drawers of water." Notwithstanding, it is advisable to arrange lecture courses and practical work of an elementary character in aeronautics specially suitable to the requirements of the man who will join the artisan section of this important industry. He will be a far better workman because of a knowledge of workshop arithmetic and drawing, supplemented by simple laboratory experiments

and by information gained whilst attending aeronautical lectures sufficient to arouse and maintain a living interest in his daily work. Some there will be who will rise through and overcome every difficulty and disability, and to these such a preliminary course of work will not only present no insurmountable obstacle, but by the facilities available will help them on their road to higher things. Such men will finally show that they are capable of successfully grappling with the higher studies requiring the more complete knowledge. A few will go beyond and raise themselves from the workman grade to that of the professional man.

The courses arranged will be progressive, the more elementary being suitable for the machine and bench hand and the higher for the leading hands, shop foremen and others.

An important question is the period of the day when such courses should be given. Up to a comparatively recent date it was assumed, almost without question, that the only time available was the evening after a full day's work had been done in the commercial workshop. For those who have attained to the position of leading hand or shop foreman it is probable that this is still the only available time. But for the juniors who have only recently left school and who are yet in their teens, it is now widely recognised that such evening work involves a strain to which the majority of youths whose physical development is still immature should not be subjected and the existence of which goes far to neutralise the educational benefit which should result. For these students " time off " during working hours is absolutely necessary, and it is indeed probable that, in the near future, legislation may require that such time off shall be given. Such proposals raise social and other questions which it would be outside the limits of this paper to discuss, but, from the educational standpoint only, the definite opinion may be expressed that compulsory attendance of the juniors in engineering works at afternoon classes should lead to valuable educational results.

At this stage it is relevant to speak more fully of the splendid work done by the Aeronautical Society and its students' section in the series of ten lectures delivered during the past six months at the Hendon centre and afterwards repeated at Cardiff. No excuse is needed for mentioning so recent a departure, for it is very probable that there are many, even members of the Society, who have not realised the educational significance of this work.

The lectures at Hendon were delivered in a conveniently-placed public hall to the employees in the numerous and important works and aerodromes congregated in the neighbourhood. No charge was made for admission. In each case the lectures were given by well-known experts in the particular subjects dealt with, and usually a well-known member of the Society presided, our worthy president being in the chair at the first meeting.

Such a series of lectures repeated throughout the country in the various industrial centres devoted to aeronautics may well be regarded as having two principal objectives, though their influence will, it is certain, be much wider. The first of these objectives is the building up of a strong students' section for the Society itself. These students' sections, in more than one of the professional societies, have been a distinct success. They are essentially democratic, being organised and conducted under the aegis of the Society by the students themselves. Ordinary members of the Society are not allowed to attend the meetings, with the one exception that at each meeting the chair may be, and usually is, at the invitation of the students, taken by a prominent member of the Society. The idea is that the meeting room should not be filled with expert critics before whom the students would be unwilling to air their original, if somewhat crude, notions .As a rule a student who has had special connection with a definite part of the subject is put up to read a paper. Other students diligently get up as much as they can of the subject in the time available and mercilessly criticise their colleague. The chairman acts as a moderator, and, whilst not sparing in his criticism, it is hoped, and, as a matter of fact, as a rule, it usually so happens that he criticises with the necessary courtesy and consideration.

The other object which the lectures at Hendon and similar lectures may be regarded as serving is the popularising and stimulation of further study amongst those actually engaged in the lower ranks of the industry. Incidentally such lectures must lead to the desire on the part of the more ambitious, who, we may hope, in this industry will be the majority, to systematise their knowledge by attendance at well-organised technical courses. Should this object be attained, nothing but good can result to the industry as a whole.

One need not dwell at length upon other and obvious advantages in such courses of lectures, not the least of which is the personal intermingling of so many young men with similar aims who will be the standard-bearers as well as the chiefs and captains of industry in the not very distant future. An intimate knowledge of those who are to be either directly associated with oneself or to be one's competitors is not the least effective factor in a successful career in any large industry such as that which we are considering.

Turning now to the second category for whom special educational facilities should be provided, aeronautical lectures, laboratory, and drawing office classes dealing with the subject matter outlined in the syllabuses will be the first essential and will meet the requirements in many cases.

For many such students, however, still more specialised instruction in aeronautical engineering is desirable, and indeed necessary. For this purpose occasional or visiting lecturers or instructors with special qualifications should be appointed both for day and evening work. These lecturers should be intimately connected with the design and construction of aeroplanes as part of their regular daily work and should be men who have themselves received a sound and thorough technical training in the advanced as well as the more elementary fundamental principles of engineering theory. In other words, they should be highly trained on the theoretical side as well as on the practical side. Moreover, an endeavour should be made to select men with a special knowledge and skill in particular branches of aeronautics, and special lecture or instruction courses should be arranged accordingly. The following are some of the subjects in which such instructors may be required for lecture and design classes :—

1. General aeronautical engineering.
2. *Fuselage* design.
3. Aero engines.
4. Aero propellers.
5. Magneto-electric ignition and other auxiliary electrical devices.
6. Meteorology and the meteorological conditions during flight.
7. The behaviour of aeroplanes in the air and aircraft performance treated by an expert engineer-aviator.
8. Dirigibles and lighter-than-air machines.

The above are suggestions for consideration based on some experience, with successful results, in providing special lectures with expert instructors in specific subjects. It will be well understood, however, that the highly special work, some of which is outlined, cannot be fully taken advantage of by individual students until the elementary and the higher general engineering and aeronautical work have been fully assimilated. It has become too much the fashion in some quarters to advertise and give special lectures in aeronautics without realising that such lectures are not likely to be of practical value until they are developed into special treatment on the drawing board, the laboratory, and the shops.

For the best results the specialised lecturer in some of the above subjects should also conduct the design or drawing office class for his special section of the work, or failing this, the class should be taken by another properly qualified designer with intimate knowledge of his subject.

Research Assistants and Scholarships.

There remain two other sections of the subject to which it is important that some reference should be made, namely : (i) research and (ii) scholarships, and these may well be taken together. It has already been pointed out that much of the laboratory work in aeronautics at the technical colleges will necessarily be of the nature of research work, and in order that this work may be efficiently carried out it is essential that the ordinary teaching staffs should be strengthened by the appointment of

(*a*) Research assistants.
(*b*) The establishment of senior scholarships and research studentships.
(*c*) The establishment of junior scholarships.

on the lines set forth in a Report issued last year by the Committee of the Privy Council for Scientific and Industrial Research, now the Department of Scientific and Industrial Research.

These additional assistants should act under the direction of the professor or head of department, who would suggest lines of research in addition to those suggested by the assistants themselves. Suggestions for researches from other quarters such as the Aeronautical Society should also receive every consideration, and, where funds are available or can be provided, a serious effort should be made to enlist the direct interest and support of the local education authorities.

In view of the fact that the research assistant would be appointed to work at a particular college, it is recommended that as the success of the work would depend very much

upon the qualifications and personality of the assistant, his selection should be made by the technical college concerned and on no account by competitive examinations. The donors of any funds for providing the research assistant would, of course, be consulted.

A suitable research assistant having been appointed, he should give his whole time to the work, but in the general interest of aeronautics it should be possible for his services to be utilised for teaching work in aeronautics for a certain number of hours during the teaching session. This arrangement would be advantageous in giving the assistant a very vital grip of the general aspects of his subject, and would be specially useful to him as well as to the teaching profession if he intended later to become a teacher of aeronautical engineering.

It is, of course, assumed that the assistant appointed would be well qualified for research work, and that he would not necessarily require any considerable proportion of the time of the head of the department, otherwise his appointment would be of doubtful value.

With respect to (*b*), it is as well to emphasise the difference between research which might be done by technical students and research which should be done by a research assistant, the former being of the nature of training in methods of research rather than the actual undertaking of new work, which would be the proper function of the research assistant. It is therefore desirable that, in view of the importance of their other work, senior students during the last years of an ordinary engineering course should be trained more in methods of research rather than in actual researches for publication occupying a disproportionate volume of their time.

It is also recommended that selected students who have completed an ordinary or other approved course of training should be appointed "research students" with a small maintenance allowance, less than that allotted to research assistants, the necessary funds to be provided from the same source as the funds for research assistants. In course of time this procedure may prove of material assistance in the selection of suitable research assistants.

There will be no difficulty in a fair number of subjects for research being suggested in any large engineering department, and researches may also be suggested by manufacturers. With regard, however, to the latter source of inspiration, it is recognised that engineering manufacturers in both small and large ways of business must have a number of problems from time to time requiring scientific investigation, but whether these manufacturers would be willing to submit to the publicity consequent upon the acceptance of public money for the purpose of the carrying out of an investigation appears to be very doubtful. In other words, manufacturers may be expected to be willing to suggest and assist in a research provided they can reap the sole benefits of the results, but may not be so willing if it be a condition that the results are to be publicly published and placed at the disposal of their trade rivals.

With respect to (*c*), junior scholarships should be awarded to selected evening students who have, with marked success, attended evening classes or courses for, say, two or three sessions. These scholarships, with a small maintenance allowance, will permit of their holders to attend a full engineering course in the day time.

Conclusion.

The above does not by any means exhaust the subject of the training of aeronautical engineers, but the authors trust that they have dealt sufficiently with the main lines to stimulate discussion and to bring this important aspect of the subject in precise form prominently before their engineering colleagues.

They hope that the next and subsequent sessions of the Universities and the technical colleges will witness a great development all over the country in the direction of providing sound instruction courses in aeronautical engineering.

If this hope be realised the time spent by the authors in the preparation of this paper will not have been spent in vain.

APPENDIX I.—SPECIAL SYLLABUSES.

I.—*General Aeronautics*—(*Principles and Machines*).

The atmosphere—properties. Air at rest and in motion. Meteorology.

Definitions and first principles.

Action of air current on plane and curved surfaces. Mass, centre of gravity, centre of pressure, lift, thrust, &c. Inertia.

Resistance to motion—wing, body and *fuselage* parts. Stream line flow.

The methods used by various experimenters to determine quantitatively the air pressures on planes and bodies. Experimental data. Illustration by smoke photographs.

Angle of incidence, aspect ratio, plan form. Flight-gliding—horizontal and oblique, flight paths. Loading, speed and power. Range of power. Climbing. Equilibrium and stability—longitudinal, lateral and directional. Automatic stability. Stability devices. The tail or elevator. Dihedral angle. Steering. Propulsion, position of screws and direction of thrust. Stability and speed.

Distribution of pressure on wing elements. Movements of the C.P. on wing sections.

Laws of similitude.

Turning, elevating or depressing, banking, rolling, pitching, skidding, looping, &c.

Oscillations. Gyroscopic action. Effects of fluctuation of stresses on the structural parts. Fatigue of materials and of structural members.

Design.—The mechanical design and construction of aeroplanes. Wing surfaces and camber—forms and arrangement. Monoplanes, biplanes and multiplanes; wing warping; the *fuselage*, body, stays, struts and attachments; the undercarriage and shock absorbers. Starting and alighting devices. Boxing in and form of envelope. Skin friction. Bearings and joints. Transmission mechanisms. Controls. Instruments.

Materials of construction:—Steel, special alloys, wood, paints, varnishes, &c.

Assembling. Storage accommodation, heating, lighting, signals, &c. Cost.

Dirigibles. Seaplanes and lighter-than-air machines.

Accidents and their cause, analysis.

Applications.—Radii of action. Warfare, sport. Passenger, mail, &c. Speed and distance. Cost per ton mile. Modifications in design.

II.—*Aero-Engines.*

Cycles for internal combustion engines—Otto and two-stroke cycles. Advantages and disadvantages. Ideal and practical thermal efficiencies. Special considerations in designing aero engines of reasonable weight. General theoretical and practical calculations. Weight and power of engines in relation to aeroplane speed range.

Petrol, its combustion and behaviour in the cylinder. Petrol storage in machines.

Arrangement of cylinder and crankshaft torque. Balancing. Vibration, periodic and variable, and dangerous stresses.

Water-cooling systems. Air cooling.

Lubricating systems. Lubricating oils and testing.

Types of aero-engine—horizontal, vertical, diagonal, or V. Radial or rotary and special considerations in design. The aero-engine of the future.

The design of special mechanisms and parts, such as cams, valves, port and pipe ways. Carburettors and carburation.

The fixing of the engine.

Ignition and electrical devices. Sequence or order of firing. Wiring and connections.

Accessibility of parts for rapid de-mantling and re-assembling. Reliability and durability in running.

III.—*Aerial Propellers.*—(*Their Theory and Design.*)

Geometry of the screw and of propeller. Definitions. Air flow and forces on blade elements. Principles and formulæ. Blade shapes and sections. Various graphs for load, stresses, thrust, efficiency, horse-power, &c. Stresses due to centrifugal action and due to bending. The air screw at different speeds of translation. The propeller considered as an helicopter. Lifting effort. Effect of propeller on stability of machine with calculation on couples due to gyroscopic action. Design of propellers.

Materials used in construction. "Laying out" of an air screw. Results of researches on the behaviour of air screws in the laboratory and under practical conditions of flight.

APPENDIX II.—TIME-TABLES.

PART I.*—*Aeronautical Engineering.*

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
10.0	Mathematics	Mathematics Exercises	Mathematics Exs.	Mathematics	Engineering Drawing and Design
11.0	Mechanics* Mechanics Exercises	Physics (Optics)	Physics (Heat)	Physics (Electricity and Magnetism)	
12.0	Mechanics	Engineering Design Lecture (A)	Physics Exercises	Mathematics and Physics Exercises	
2.0	Freehand Drawing	Physics Laboratory	Chemistry Lecture.	Engineering Workshop	Physics Laboratory
3.0	Mechanics Laboratory		Chemistry Laboratory		
4.0					Gymnasium

*Each part covers a session's work.

PART II.—*Aeronautical Engineering.*

Hours.	Monday	Tuesday.	Wednesday	Thursday.	Friday.	Saturday.
10.0	Theory of Machines (A)	Materials (A)	Electrical Technology (A_2)	Engineering Chemistry Lecture.	Engineering Drawing	Engineering Workshop
11.0	Mathematics	Electrical Technology Exercises	Mathematics	Engineering Chemistry Laboratory		
12.0	Heat Engines (A)	Electrical Technology (A_1)	Engineering Design Lecture (B)			
2.0	Electrical Technology, Laboratory	Engineering Exercises	Engineering Exercises	Engineering Exercises	Electrical Technology, Laboratory	
3.0		Power Laboratory	Mechanics and Materials, Laboratory	Engineering Drawing		
4.0					Gymnasium	

PART III.—*Aeronautical Engineering.*

10.0	Aeronautical Drawing	Aeronautical Exercises	Graphics	Materials	Engineering Exercises	Aeronautical Laboratory
11.0		Aeronautical Lectures (Principles)		Theory of Machines	Hydraulics and Pneumatics	
12.0 to 1.0	Electrical Technology	Mathematics		Mathematics	Engineering Exercises	
2.0	Electrical Technology, Laboratory	Aeronautical Drawing	Aeronautical Drawing	Aeronautical Drawing and Design	Engineering Workshop.	
3.0		Aeronautical Lectures (Machines) Aeronautical Exercises				
4.0 to 5.0	Gymnastics	Gymnastics				

PART IV.—*Aeronautical Engineering.*

10.0	Aeronautical Drawing	Machines and Structures	Engineering Workshop	Materials	Aeronautical Drawing and Design, Laboratory	Aeronautical Laboratory
11.0		Mathematics		Mathematics		
12.0 to 1.0	Aeronautical Lectures (Engines and Propellers)	Engineering Exercises		Engineering Quantities and Estimating		
2.0	Aeronautical Exercises	Aeronautical Drawing and Design	Aeronautical Drawing and Design	Engineering Exercises	Materials Lectures or Laboratory	
3.0	Engineering Exercises			Aeronautical Lectures (Machines and Design).		
4.0 to 5.0	Gymnastics			Gymnastics		

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AERONAUTICAL SOCIETY OF GREAT BRITAIN.

THE following have been elected to the Aeronautical Society:—

Fellows.—F. W. Lanchester, M.Inst.C.E.; Duguld Clerk, D.Sc., F.R.S.; Lieut.-Col. Mervyn O'Gorman, C.B.

Associate Fellows.—Lieut.-Col. R. K. Bagnall Wild, G. H. Handasyde, T. G. John, A. W. Judge, H. P. Martin, R. Borlase Matthews, R. Richardson, Capt. T. E. Robertson, F. R. Smith, T. O. M. Sopwith, W. G. Carter, F. Sigrist, Capt. W. S. Farren, Lieut. Norman Barrett, Capt. F. S. Barnwell, E. G. Walker, R. H. Verney, W. H. Allen, L. W. Bryant, W. H. Barling, Dr. J. E. Ramsbottom, Thos. Jones, C. W. Alexander, J. M. Heesem, Commander W. Briggs, H. B. Irving, R. A. Bruce, Capt. H. Grinsted, J. G. Florence, E. Spencer, H. Knowler, Lieut. H. E. Wimperis, W. Brierley, G. P. Bulman, F. T. Hill, A. S. A. Ormsby, W. E. Dommett, C. H. Brooks, S. H. Smith, J. D. Scaife, H. T. Tizard, J. B. Blondeau, K. Secretan, E. G. Cole, H. C. Fuller, G. H. Hales, C. H. Powell, J. R. Pannell, R. Chadwick, E. Robinson, D. P. Monckton, G. E. Barnhart, O. W. Thomas. A. A. Remington.

Student Members.—A. J. T. Ireland, W. H. Lyne, H. Yendall, W. E. James, J. Williams, L. S. Flatman, R. K. Heysham, J. N. F. Morris, R. W. Sutton, Joseph Shepherd, V. W. Derrington,

Members.—Brig.-Gen. D. Pilcher, N. G. Gwynne, Lord Cowdray, Gen. W. B. Caddell, F. M. T. Lange, J. H. Newton, Miss E. M. L. Wade, C. G. Gourlay, W. J. Skevington, Capt. A. H. Burgoyne, M.P., B. Wortman, H. S. O'Brien, H. T. Vane, R. F. Rowbotham, H. Knox, H. Noel, J. P. H. Bewsher, A. Boake, R. C. Searle, H. G. Wells, E. H. Dyson, Lieut. W. R. Dainty.

Associate Members.—D. M. Sullivan, S. Holroyd, Lady Jenkins, R. G. Laws, J. N. P. Morris, J. B. Phillips, R. C. Carver, Mrs. St. John, A. Davidson, W. Thorpe Haddock, W. Chater Lea, D. Mooney, F. J. Poynton, Miss A. Freeland Squire, C. W. Mayne, E. Scott.

W. BARNARD FARADAY, Secretary.

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Air Work in the Rain.

DEALING with the advance on Avion, to the south of Lens, which took place during a violent thunderstorm, Mr. W. Beach Thomas, in the *Daily Mail*, says :—

"Our aeroplanes were thick in the air up to the very crack of doom. Some, as they shot homeward, dropped brilliant starlights, and one plane seemed to have a peculiar affection for one gun—it kept returning to its friend. Once it tumbled down head over heels anyhow, almost on to the top of its friend; once it coasted smoothly down, whispering into its ear congratulations on its work. But the bulk of our planes, which were almost unopposed, were unnoticed unless they were in vast groups or engaged in some unusual tactics."

An Air Raid in Palestine.

MESSAGES from Cairo give details of a very successful raid in Palestine on June 24th. A number of machines flew over the Turco-German aerodrome at Ramleh and dropped a cargo of bombs with marked effect upon the hangars and adjoining camps. The attack was made from a comparatively low altitude, and many direct hits were observed. Any German machines which may have been within the hangars will not be in a condition to take the air for some time to come. All our machines returned safely. Simultaneously naval aircraft visited Tul Keram, some miles north of Ramleh, and bombed the railway station and dumps in the vicinity.

Air Raids on Palestine.

WRITING from the Army Headquarters in Egypt, Mr. W. T. Massey, on June 30th, says :—

"Several important air raids were carried out last week The Naval Air Service attacked the important depôt at Tul Keram, north-east of Jaffa, inflicting severe damage. A squadron attacked the headquarters of the Fourth Turkish Army, the Augusta Viktoria Hospice, a mile from the walls of Jerusalem, and dropped 50 bombs on the buildings. The Turks say that the British bombed the Holy City of Jerusalem, sacred alike to Mohammedans and Christians, but that, thanks be to God, no damage was done. The city, of course, was not bombed, but four bombs hit the roof of the Turkish headquarters."

Rammed by Burning Machine.

THE *Frankfurter Zeitung* is authority for a thrilling story involving the death of the pilot Riessinger, who had, before he met his fate, shot down four enemy machines. It is asserted that during his last fight he succeeded in setting fire to the machine of his British opponent, but the latter, seeing that he was unable to escape death, rammed Riessinger's machine, with the result that both airmen fell to the ground.

Precautions at York Minster.

PREACHING in the Minster on Sunday last, the Dean of York said that one by one the glorious stained glass Minster windows, not only the pride of the city of York, but the unique possession of the English Church, were being taken down because the enemy sought destruction with engines of war unknown in the days of old and with a ruthlessness unequalled in the most savage times.

SIDE-WINDS.

THE new works of the A.G.S. Manufacturing Co., in Lacland Place, Chelsea, are becoming equipped apace, and during the ensuing few weeks will be fully established with the necessary huge plant to carry out the company's programme for supplying metal parts in large quantities for both aeroplanes and engines. Already one of the three giant floors is in full swing with some forty to fifty separate machines, and the second floor is ready to receive delivery of the 40 lathes expected during the next few days. The ground floor is reserved entirely for drop forgings. The installation of such a plant goes to prove the company's assertion that they are not factors, but right-down, rock-bottom manufacturers, with a keen sight into the coming of commercial aeronautics, and the determination to be well in the forefront of supply.

MESSRS. ARROL-JOHNSTON, LTD., Heathhall, Dumfries, Scotland, announce that their application for the registration of their trade-mark, consisting of the words "Arrol-Johnston," has been accepted in Class 22 in respect of motor cars under sub-section 5 of Class 9 of the Trade-Marks Act, 1905, and they have been notified by the Registrar of Trade-Marks that the mark applied for be deemed a distinctive mark. Which reminds us. The "standard" A.J. design of the Arrol-Johnston firm, which distinguishes most of their advertisements in the daily newspapers, is, in our opinion, one of the most striking items we have seen to attract the attention of the reader. We hope the firm have not failed to also secure by registration this clever design.

AMONG those who make a speciality of assisting manufacturers in druwing up their advertisements is Mr. Ernest Ingram Hill. Why he has been so successful in his efforts is explained in a little brochure entitled "Co-operation in Engineering Advertising." Having served his apprenticeship with a firm of engineers before turning his attention to the advertising world, Mr. Hill is in a position to appreciate and set forth the many technical points which need emphasising in an engineering announcement. Anyone interested can obtain a copy of the booklet by writing to Mr. Hill at 2, The Broadway, Wimbledon, S.W.19.

ONE of the most interesting items of the current issue of the *Advertising World* is a little pen sketch of Mr. Charles Anthony Vandervell, of C.A.V. fame, written by Mr. Arthur Goodwin, than whom none is more qualified to speak on the subject. Albeit the sketch is brief, from its intensive style it loses nothing on that account, and every one reading it will be glad that the original intention of C.A.V. becoming a stockbroker was frustrated by the early development of his electrical bent. A lifelike drawing of Mr. Vandervell by M. Klang accompanies the article.

WE regret to learn that Mr. H. Sykes, the well-known Whitehead aircraft pilot-tester, met with a mishap on Tuesday afternoon last week while flying at the Hanworth Park Aerodrome. He was testing a new Scout machine, prior to delivery to a flying station, when the engine failed. The latest news to hand reports that he is making splendid progress, and, except for the "breakages," is reported quite well. One and all wish him a speedy recovery.

A BRITISH engineer in London with capital and a live business organisation writes to say that, in view of the extreme need for the rapid development of our aircraft service, he is prepared to co-operate financially and actively with any good firm and accept a seat on the board of management. If any of our readers know of the existence of such an opening, and will write to "Alpha," c/o the Editor of this journal, he will be pleased to place them in communication with the writer.

The Demand for Aeroplanes.

SPEAKING at a meeting of munition workers at Birmingham on June 29th, Mr. Kellaway, Secretary to the Ministry of Munitions, said: Demands for an immensely increased output of aeroplanes to prevent daylight raids on our towns and villages were now being made. The output was increasing, but the wastage was enormous. Personally he held, if we could systematically and immediately raid German towns every time a raid was made here, Germany would speedily abandon the senseless and brutal forms of warfare, but we did not possess an unlimited supply of aircraft.

An Excellent Apprenticeship Scheme.

THOSE who are interested in the splendid scheme for the improvement of apprenticeship conditions, upon which we comment in one of our leaders this week, should note that a pamphlet, giving the conditions, the rules and regulations for apprentices, and a copy of the indenture can be obtained from the Gnome and Le Rhone Engine Co., Blackhorse Lane, Walthamstow, E.17

The Bombs of Zierikzee.

IT has been announced by the Dutch Ministry for Foreign Affairs that the British Government having declared its readiness to hold an investigation into the question as to whether the bombs dropped on Zierikzee in April last were from a British aeroplane, Col.-Lieut. C. van Tuinen, of the General Staff, is proceeding to London, with fragments of the bomb, to attend the enquiry. The Belgian and French Governments, after thorough investigation, have declared that it was not possible that the incident could be attributed to a French or Belgian aeroplane.

A Gift from India.

IN honour of the King-Emperor's Birthday, Maharaja Bahadur Sir Rameswar Singh of Darbhanga has given a sum of two lakhs of rupees (£13,333), for the purchase of aeroplanes.

It's an Ill Wind.

THE shaft of an aerial torpedo which fell in London during the raid was recently raffled for, and produced £108, which has been sent to the Lord Mayor's Fund.

The Survivors of "Z. 48."

IT has now transpired that three of the crew of the Zeppelin "Z.48," which was brought down in flames on June 17th, succeeded in escaping with their lives. Of the three, one is Lieut. Mieth, the second in command, who had both legs broken. The other two are warrant officers, and while one has a broken leg and other injuries, the other escaped with nothing worse than a bruise behind the ear. The latter stated that his coat was fitted with a device which enabled it to be converted into a parachute.

According to further particulars available, it now appears that the commander of the Zeppelin was Capt. Lieut. Eichler, and not Capt. Viktor Schutze, as announced by Berlin. Is this explained by another Zeppelin, with Capt. Schutze in command, having been lost at sea on that occasion? It may be recalled that the German official statement announced that Capt. Schutze's vessel came down in the sea.

CORRESPONDENCE.

Subsidy and Interference.

[1936] I notice in Col. Mervyn O'Gorman's lecture that he does *not* point out the very serious danger which will attend State subsidation of aeroplane making which he seems to advocate—namely State interference. There are plenty of people who will, on the one hand, see to it that the subsidy is as small as possible, and, on the other, that the interference is a maximum.

This aspect also needs ventilation.

J. S. FAIRBANKS.

Hythe, June 26th, 1917.

NEW COMPANY REGISTERED.

FULHAM SMALL ARMS, LTD., 82A, Lillie Road, Fulham, S.W. 6.—Capital £50,000, in 40,000 pref. shares of £1 each and 200,000 ordinary shares of 1s. each. Acquiring as a going concern, *inter alia*, the business in the manufacture of small-arms carried on at Fulham by the Whitehead Aircraft, Ltd.

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Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 44, St. Martin's Lane, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.